MECHANICS' MAGAZINE,

AND

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"Now, reader, ere this work you scan,
Resolve to prove a candid man:
Not critic like, seek faults to find,
And every beauty leave behind;
But, should a weed appear in sight,
A flower cull to make it right.—
Act thus, you'll prove a candid soul;
Judge not a portion, but the whole.
This done—presuming you think fit,
That others should in judgment sit—
Let justice at the scales preside,
And strictest truth the case decide."—ANON.

HYDRAULIC DRY DOCK.

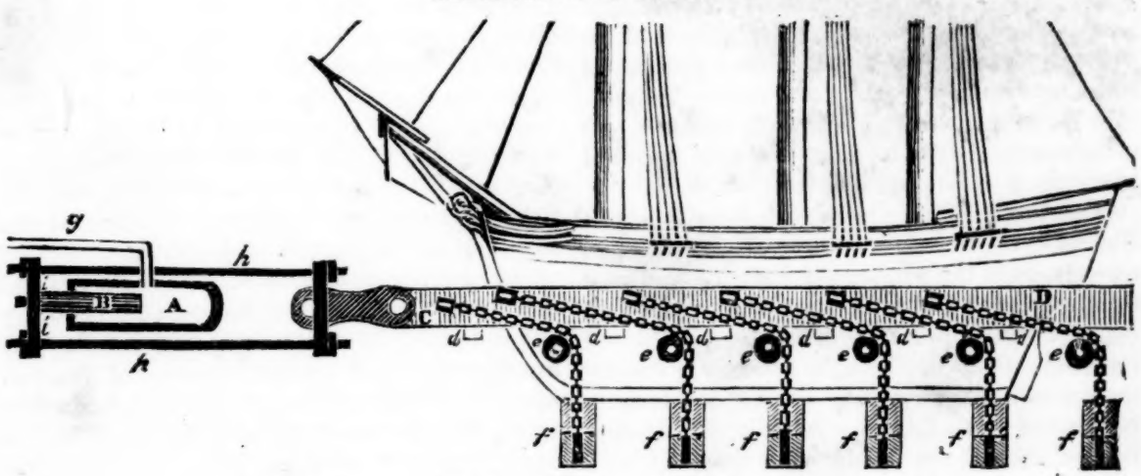
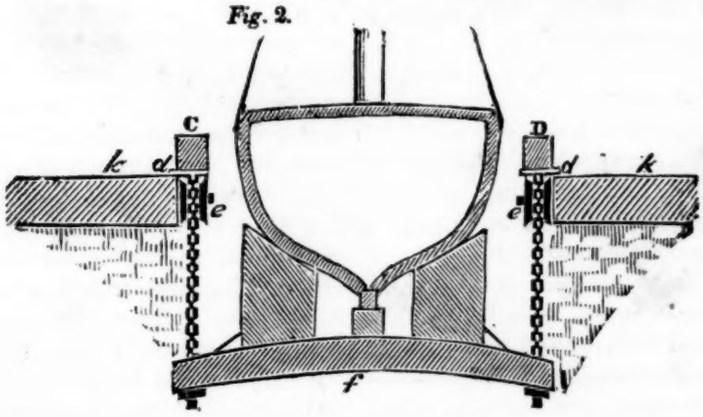


Fig. 2.



REFERENCES.—A, the cylinder; B, the ram; C D, the sliding beam; *d*, stationary slats, on which the sliding beam moves; *e*, the pulleys; *f*, timbers of the cradle; *g*, the tube, which in this case is 80 feet long; *h*, bars connecting the two plates; *i i*, the two plates; *k k*, the wharves. Fig. 2 is a transverse section, with the references to correspond.

Hydraulic Dry Dock. [Communicated for the Mechanics' Magazine, and Register of Inventions and Improvements.]

Mr. Editor—Agreeably to your request, I visited the hydraulic dry dock of Messrs. Ring & Co., in this city, and was highly gratified and unutterably astonished at witnessing the gigantic power of a little machine called a hydraulic ram. A ship of 300 tons was raised in my presence, in the short space of an hour, together with the other heavy apparatus, high and dry, out of the water!

The hydraulic ram is nothing more than a hollow cylinder, equal in length to the immersed part of the vessel to be raised; it is provided with a stuffed collar, water-tight, thro' which passes a turned iron plug, called a ram; to one end of this ram is fixed a strong iron plate, connected to a corresponding one at some distance beyond the cylinder, by strong iron bars, and also connected with a sliding beam; to this beam a powerful set of chains are attached, passing over pulleys fixed to the wharf, and passing down into the water, where they are fastened to the timbers of the cradle, in which the ship is to be placed. As I have thus far only described one apparatus, it will be necessary to mention that there are two wharves, and two sets of apparatus, exactly alike—one of which I have given a longitudinal section of.

The mode of raising a ship is as follows: She is brought in between the two wharves, exactly over the cradle—the chains are then tightened, so as to make the blocks come in contact with the keel—water is then forced into the cylinder, through a small tube, by means of a pump, which causes the ram to be forced out, drawing with it the sliding beams, raising the cradle with the ship, in a slow but majestic manner, to the required height. Respectfully, yours,

G. Lansing.

New-York, Aug. 8, 1833.

Process for Silvering Iron.—Iron is not easily silvered. The following process will be found convenient in its application to both large and small iron utensils.

After having scoured the piece of iron to be silvered, let it be very evenly rubbed with sand paper, and then dipped into a warm solution of sulphate of copper, (blue vitriol,) or of acetate of copper, (verdigris); when its surface has become red, immerse it in clean water. Should the copper not cover the surface equally, it must be again dipped into the solution. The solution of the salt of copper should not be so strong as to produce a precipitate of small particles of copper. Melt silver in a crucible, and let the iron be immersed in it, and rubbed over with a proper tool, so that the silver may adhere equally to its surface. This operation of immersing and rubbing is repeated until the silver is very evenly applied. Care should be taken to press, and not to rub, the surface, lest the thin coat of copper, which facilitates the adhesion of the silver, should be scraped off. When the silvering seems complete, the articles are removed from tne crucible and polished.—[Journal des Connaissances Usuelles.]

London Mechanics' Institution.—The following is Dr. Birkbeck's brief Address, after laying the first stone of the London Mechanics' Institution:

"Now have we founded an edifice for the diffusion and advancement of human knowledge. Now have we begun to erect a temple, wherein man shall extend his acquaintance with the universe of mind, and shall acquire the means of enlarging his dominion over the universe of matter. In this spot hereafter the charms of literature shall be displayed, and the powers of science shall be unfolded, to the most humble inquirers; for, to 'the feast of reason' which will be here prepared, the invitation shall be as unbounded as the region of intellect.

"For an undertaking so vast in its design, and so magnificent in its object, (nothing short, indeed, of the moral and intellectual amelioration and aggrandizement of the human race,) the blessing of Heaven, I humbly trust, will not be implored in vain. If in this institution we seek to obey the mandate which has gone forth, that knowledge *shall be increased;* if we act in obedience to the injunction, that in all our gettings we should get understanding; if we succeed in proving, that for the existence of the mental wilderness, the continuance of which we all deeply deplore, we ought 'to blame the culture, not the soil;' if by rendering man more percipient of the order, harmony, and benevolence, which pervade the universe, we more effectually 'assert eternal Providence, and justify the ways of God to man;' and if thus we shall be the happy means of rendering it palpable, that the immortal essence within us, when freed from the deformity of ignorance and vice, has been created in the express image of God—then may we confidently hope that Omniscience will favorably

behold our rising structure, and that in its future progress, Omnipotence, without whose assistance all human endeavors are vain, will confer upon us a portion of His powers.

"Whilst I remind you that the illustrious Bacon, long ago, maintained that 'knowledge is power,' I may apprise you that it has, since his time, been established, that knowledge is wealth—is security—is enjoyment—is happiness. It has been found so completely to mingle with human affairs, that it renders social life more endearing; has given to morality more uprightness; and, politically, has produced more consistent obedience; it takes from adversity some of its bitterness, and enlarges the sphere, as well as augments the sweetness, of every laudable gratification; and, lastly, unquestionably one of its brightest influences—it becomes at once an avenue and a guide to that "temple which is not made with hands, eternal in the heavens.'"

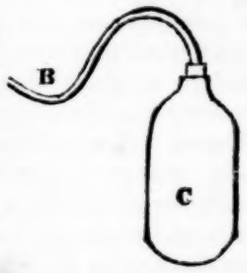
History of Chemistry. [Continued from Vol. I. page 296.]

Of Hydrogen Gas.—Another substance presents itself in the same state as oxygen; for chemists have never been able to procure it in a pure and separate state, and they have yet no proof that it exists in that state in nature. In order to discover its properties, they are obliged to examine the bodies which contain it, and by this means they are, in some measure, enabled to discover the properties it communicates to those bodies.

Though we have long possessed some knowledge of the natural inflammable vapors of the mines, and coal pits, as well as of those which are disengaged in many operations of chemistry, such as the metallic solutions in the acids, &c., it was not till 1766 that M. Cavendish ascertained the existence of this elastic fluid, and properly distinguished it from all others, by collecting it separately, and distinguishing its properties.

Hydrogen gas is not to be collected from natural bodies. That which is abundantly disengaged from fossil coal, moistened or exposed to the air, of putrid vegetables at the bottom of stagnant waters, of ponds, of marshes, of peat soil, contains but a small quantity of pure hydrogen gas. It contains many different substances in solution, and its properties vary singularly according to the number and the proportion of these substances. It is the same with what exhales from flaming volcanos, red lava flowing into water, and from sulphureous mineral waters. It will be shown hereafter, that these gases are rather different species of inflammable gases, of which hydrogen gas is the solvent of many different matters, and in various proportions.

Hydrogen gas is the lightest species of ponderable matter yet known. It can be procured only from water, of which it forms an essential constituent. The method of procuring it is as follows:—Into a phial or gas bottle C, furnished with a bent tube B, which is ground to fit the mouth of the phial, put some pieces of pure re-distilled zinc, or harpsichord iron wire, and pour on them sulphuric acid, diluted with five times its bulk of water. An effervescence will ensue, occasioned by the decomposition of the water, and disengagement of hydrogen, which may be collected in the pneumatic apparatus. For very accurate researches, it must be received in jars over mercury, and exposed to the joint action of dry muriate of lime, and a low temperature. It is thus freed from hygrometic water. In this state its specific gravity is 0·0694 at 60° F. and 30 inches of barom. pressure: 100 cubic inches weigh 2,118 grains. It is therefore about 14·4 times less dense than common air; 16 times less dense than oxygen; and 14 times less dense than azote. When it stands over water at 60°, its sp. gr. acquires an increase of nearly one-seventh; and it becomes about 0·0790. From the great rarity of hydrogen gas, it is employed for the purpose of inflating varnished silk bags, which are raised in the air, under the name of balloons.



This gas is colorless, and possessed of all the physical properties of air. It has usually a slight garlic odor, arising probably from arsenical particles derived from the zinc. When water is transmitted over pure iron in a state of ignition, it yields hydrogen gas free from smell. It is eminently combustible, and, if pure, burns with a yellowish white flame; but from accidental contamination, its flame has frequently a reddish tinge. If a narrow jar, filled with hydrogen, be lifted perpendicularly, with the bottom upwards, and a lighted taper be suddenly introduced, the taper will be extinguished, but the gas will burn at the surface, in contact with the air. Animal life is likewise speedily extinguished by the respiration of this gas,

though Sir H. Davy has shown, that if the lungs be not previously exhausted by a forced respiration, it may be breathed for a few seconds without much seeming inconvenience.

When five measures of atmospheric air are mixed with two of hydrogen, and a lighted taper, or an electric spark, applied to the mixture, explosion takes place, three measures of gas disappear, and moisture is deposited on the inside of the glass. When two measures of hydrogen, mixed with one of oxygen, are detonated, the whole is condensed into water. Thus, therefore, we see the origin of the name *hydrogen*, a term derived from the Greek, to denote the *water-former*. If a bottle, containing the effervescing mixture of iron and dilute sulphuric acid, be shut with a cork, having a straight tube of narrow bore fixed upright in it, then the hydrogen will issue in a jet, which, being kindled, forms the philosophical candle of Dr. Priestley. If a long glass tube be held over the flame, moisture will speedily bedew its sides, and harmonic tones will then begin to be heard. Mr. Faraday, in an ingenious paper inserted in the 10th number of the Journal of Science, states, that carbonic oxyde produces, by the action of its flame, similar sounds, and that therefore the effect is not due to the affections of aqueous vapor, as had formerly been supposed He shows, that the sound is nothing more than the report of a continued explosion, agreeably to Sir H. Davy's just theory of the constitution of flame. Vapor of ether, made to burn from a small aperture, produces the same sonorous effect as the jet of hydrogen, of coal gas, or olefiant gas, on glass and other tubes. Globes from seven to two inches in diameter, with short necks, give very low tones; bottles, Florence flasks, and phials, always succeeded; air jars, from four inches diameter to a very small size, may be used. Some irregular tubes were constructed of long narrow slips of glass and wood, placing three or four together, so as to form a triangular or square tube, tying them round with pack-thread. These, held over the hydrogen jet, gave distinct tones.

Hydrogen, combined with oxygen, forms water—

With	Chlorine	muriated acid
	Iodine	hydriodic acid
	Prussine	prussic acid
	Carbon	sub-carb. and carb. hy.
	Azote	ammonia
	Phosphorus	subphos, & subsul. hy.
	Sulphur	sulph. and subsul. hy.
	Arsenic	arsenuretted hydrogen
	Tellurium	telluretted hydrogen
	Potassium	potassuretted hydr.

In the Philosophical Magazine, we have the following notice of the effect of hydrogen gas on the voice :—"The *Journal Britannique*, published at Geneva by Prevost, contains the following article: 'Maunoir was one day amusing himself with Paul at Geneva, in breathing pure hydrogen gas. He inspired it with ease, and did not perceive that it had any sensible effect on him, either in entering or passing out of his lungs. But after he had taken in a very large dose, he was desirous of speaking, and was astonishingly surprised at the sound of his voice, which was become soft, shrill, and even squeaking, so as to alarm him. Paul made the same experiment on himself, and the same effect was produced. I do not know whether any thing similar has occurred in breathing any of the other gases.'"

Of Carbon.—The name of Carbon has been given by the French chemists to a simple or undecomposed matter, abundantly contained in the different known species of coal, but which it is very essential should not be confounded with what is properly called charcoal. This last substance is most frequently a black matter, which remains after the partial decompositions of vegetable or animal substances, effected by nature or by art. Besides the carbon which it conceals in its composition, it is loaded with many other substances which are foreign to carbon, and cannot completely be separated but by perfect combustion.

It is, therefore, necessary, in order to form a proper notion of the nature of carbon, to adopt ideas similar to those which were detailed in the preceding articles concerning oxygen and hydrogen. Pure carbon does not exist in nature, nor has it yet been produced by art, any more than the bodies just mentioned; or at least, if carbon exists pure, or insulated, in any part of the globe, chemists have not yet discovered it. But, notwithstanding this resemblance, carbon differs materially from oxygen and hydrogen; namely, in this circumstance, that it is never found united to caloric under the gaseous form, and also that, even in the state of charcoal, it may, at least, in some species of the charcoals, be regarded as nearer to its state of purity, and more proper to exhibit the properties which characterize it, than these two bodies in any of their combinations.

Carbon also differs essentially from oxy-

gen, for it is no where collected in such great masses, though it is very abundant among natural combinations. It is, undoubtedly, one of the principles which nature abundantly employs in the formation of compounds; but it is never found combined in a mass like oxygen gas. It appears, however, that though far from a state of purity, it exists, at least, under the fossil form in depositions, or beds, and veins, in the interior of the globe.

Carbon is procured, not, however, pure and separated from every other body, but more or less approaching to purity, by decomposing most vegetable substances, by heat, especially ligneous or woody bodies, which contain a great quantity of it. From these it is obtained in the state of charcoal. The carbon is united with some foreign bodies, and a little oxygen and hydrogen, the volatilizing of all the evaporable substances united with it in wood constitutes the art of the charcoal burner. The water, in which trees are suffered to remain, produces the same effect, but more slowly, upon the ligneous vegetable body. It gradually dissolves the different soluble materials of that body, and leaves its charcoal free.

If a piece of wood be put into a crucible, well covered with sand, and kept red hot for some time, it is converted into a black shining brittle substance, without either taste or smell, well known under the name of *charcoal*. Its properties are nearly the same from whatever wood it has been obtained, provided it be exposed for an hour in a covered crucible to the heat of a forge.

Charcoal is insoluble in water. It is not affected (provided that all air and moisture be excluded) by the most violent heat which can be applied, excepting only that it is rendered much harder and more brilliant.

It is an excellent conductor of electricity, and possesses besides a number of singular properties, which render it of considerable importance. It is much less liable to putrify or rot than wood, and is not therefore so apt to decay by age. This property has been long known. It was customary among the ancients to *char* the outside of those stakes which were to be driven into the ground or placed in water, in order to preserve the wood from spoiling. New-made charcoal, by being rolled up in cloths which have contracted a disagreeable odor, effectually destroys it. When boiled with meat beginning to putrify, it takes away the bad taint. It is perhaps the best teeth powder known. Mr. Lowitz, of Petersburg, has shown that it may be used with advantage to purify a great variety of substances.

New-made charcoal absorbs moisture with avidity; when heated to a certain temperature, it absorbs air copiously. La Metherie plunged a piece of burning charcoal into mercury, in order to extinguish it, and introduced it immediately after into a glass vessel filled with common air. The charcoal absorbed four times its bulk of air. On plunging the charcoal into water, one-fifth of this air was disengaged. This air, on being examined, was found to contain a much smaller quantity of oxygen than atmospherical air does. He extinguished another piece of charcoal in the same manner, and then introduced it into a vessel filled with oxygen gas. The quantity of oxygen gas absorbed amounted to eight times the bulk of the charcoal; a fourth part of it was disengaged on plunging the charcoal into water.

This property of absorbing air, which new-made charcoal possesses, was observed by Fontana, Priestley, Scheele, and Morveau; but Morozzo was the first philosopher who published an accurate set of experiments on the subject.

These experiments have been lately repeated upon a larger scale by Mr. Rouppe, professor of chemistry at Rotterdam, and Dr. Van Noorden, of the same city. They filled a copper box, which was made air-tight, with red-hot charcoal, allowed it to cool under water, and then introduced it into a glass jar, full of air. Seventeen cubic inches of charcoal absorbed, in five hours, 48 cubic inches of air, or one-third nearly of its bulk. This absorption, though much more considerable than could have been expected from former experiments, has since been confirmed by several chemists.

When charcoal is heated to about 802°, or when it is made nearly red hot, and then plunged into oxygen gas, it takes fire; and, provided it has been previously freed from the earths and salts which it generally contains, or if we employ *lamp-black*, which is charcoal nearly pure, it burns without leaving any residium. But the air in which the combustion has been carried on has altered its properties very considerably, for it has become so noxious to animals that they cannot breathe it without death. If small pieces of dry charcoal be placed upon a pedestal, in a glass jar filled with oxygen gas, and standing over mercury, they may be kindled by means of a burning glass, and con-

sumed. The bulk of the gas is not sensibly altered by this combustion, but its properties are greatly changed. A great part of it will be found converted into a new gas, quite different from oxygen. This new gas is easily detected by letting up *lime-water* into the jar; the lime-water becomes milky, and absorbs and condenses all the new-formed gas. This new gas has received the name of *carbonic acid*. Mr. Lavoisier ascertained, by a very laborious set of experiments, that it is precisely equal in weight to the charcoal and oxygen gas.

Carbon, when pure and free from the foreign substances with which it is united in charcoals, appears to exist, under the form of solid particles, of a black so determinate, as would lead us to think that it is essentially of that color, and that it communicates it to a number of other bodies. It is the excess of carbon, as will be noticed hereafter, which produces the greater part of vegetable colors, and which also renders them durable and intense. It appears also that it gives the same shade in some mineral compounds, of which it forms an essential part.

But there are, nevertheless, reasons for thinking that the black color of charcoals is not a true character of *carbon*, and that it accompanies its union with a small portion of oxygen and hydrogen, from which, in its state of charcoal, it is never exempt.

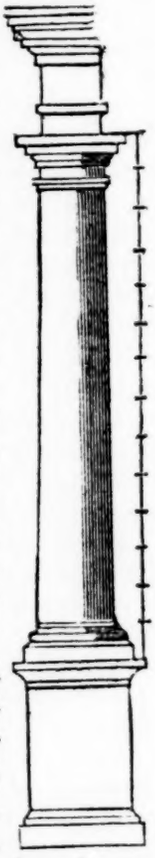
The diamond, which, under certain relations, nearly approaches to pure carbon, is so much the more white and transparent as it is less altered by foreign substances.

Carbon has neither taste nor smell, and its particles never possess an adherence sufficiently strong to prevent their being very brittle; this brittleness is also greater in charcoals, as the carbon is more contaminated with other bodies. It is probable that the particles of carbon always remain at a very great distance from each other. They do not possess the property of disposing themselves regularly, and never permit it to assume a crystaline form in the state of charcoal, although it is highly probable that it is capable of this arrangement when very pure.

Of the Orders of Architecture. [Continued from Vol. I. p. 284.]

We have already stated at page 226 that the orders as now executed are five in number, viz. the Tuscan, Doric, Ionic, Corinthian, and Composite; the first and last of which are Roman, and the others Greek. These orders are chiefly distinguished from each other by the *column* with its *base* and *capital*, and by the *entablature*.*

Tuscan Order.—The title of this order leads us to assign its origin to Tuscany, in Italy; and this conjecture is strengthened by the inhabitants of that country being admitted to be the offspring of the *Dorians*.



The Tuscan order is characterized by its plain and robust appearance, and is therefore used only in works where strength and plainness are required: it has been used with great effect and elegance in that durable monument of ancient grandeur, Trajan's Column, at Rome. But the best modern example of this order is St. Paul's Church, Covent Garden, London.

No ancient remains of this order having been discovered with *entablatures*, it is only from the accounts given by Vitruvius, that the form and ratio of its members can be determined; he allows *seven diameters* for the *height* of the *columns*, and diminishes the upper part one fourth of half the diameter; the *base* is half a diameter in height, one half of which is given to a circular *plinth*, and the other to a *torus*;† the *capital* is also half a diameter in height, and one in breadth upon the *abacus*;‡ the height is divided into three parts, one of which is given to the *abacus*, one to the *eschinus*, and the third to the *hypotrachelian* and *apophygis*; the *architrave* has two faces, with an aperture between them of about an inch and a half, for the admission of air to preserve the beams; the lower face is vertical upon the edge of the top of the column; the *frieze* is plain and flat; the *mutules*, or ornamental parts of the *cornice*, project over the beams, equal to one fourth of the height of the column.

Doric Order.—This is the most ancient of the five orders, and while employed by the

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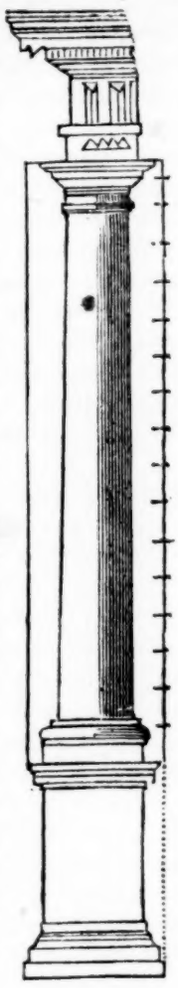
* The Entablature is an ornament or assemblage of parts, supported by a column over the capital: each order of columns has a peculiar entablature divided into three principal parts, the architrave, frieze, and cornice, (see p. 234.)

† A *torus* or tore is a large semi-circular moulding, used in the base of a column.

‡ The *abacus* is the upper member of a column, which serves as a covering to the capital.

Greeks, was without a base; the surface of its shaft is usually found worked into twenty very flat flutes, meeting each other at an edge, which is sometimes a little rounded; the upper member of the capital is a square abacus or thin plinth, under which is a large and elegantly formed ovolo, with a great projection; immediately under the ovolo, there are three fillets or annulets, which project from the continued line of the under part of the ovolo, and have equally recessed spaces between them; the flutings of the column are terminated by the under side of the last of these three fillets, and either partly or entirely in a plane at right angles with the axis of the column.



The *architrave* is composed of one vertical face, with a band or fillet at its upper edge; to the under side of this band are suspended a small fillet and conical drops, or *guttæ*, which, for their position, are dependent upon the ordnance of the frieze.

The *frieze* consists of rectangular projections and recesses placed alternately. The height of each projection or tablet is rather more than its breadth.

The recesses are either perfectly or nearly square. The tablets are each cut vertically into two angular channels, with two half ones on the extreme edges; each channel is formed by two planes meeting at its bottom at a right angle, and each forming an angle of 135° with the face of the tablet.

The upper ends of the channels are terminated in various forms; the tablets are, from their channelings, named triglyphs; in a direction immediately under each triglyph, and equal to its breadth, a small fillet is attached to the lower side of the architrave crowning band, and from it depend six guttæ or drops, which are generally the *frustra*, or lower parts of cones, with their bases downwards, though they are sometimes of a cylindrical shape.

The square spaces in the frieze between the triglyphs, are named metopes, and are frequently decorated with sculptures.

The *cornice* is strongly marked by a corona of great projection, forming a very distinct separation between its upper and lower parts; and by having, below the corona, and immediately over the triglyphs, blocks, named mutules, which also project considerably, and have the plane of their soffits with an inclination from their roofs towards the horizon, and these have likewise guttæ or drops depending from their soffits.

The established proportions for the construction of the Doric order are the following. Considering the diameter that of a circle, at the lower end of a shaft, the column is six diameters in height. The thickness of the upper end of the shaft is three-fourths of the lower, or it diminishes one-fourth of the diameter.

The height of the capital is half a diameter. That of the ovolo, with the annulets, and that of the abacus, are each one quarter of the upper diameter. The annulets are one-fifth of one of the parts. The horizontal dimensions of each face of the abacus is six times its height. The entablature is divided into four equal parts; the upper one is the height of the cornice; the remaining ones are divided equally between the architrave and frieze. The inner edge of the angular triglyph is placed in a vertical line with the axis of the column. The height of the triglyph is divided into five equal parts; three of these parts give the distance of its returning face, and determine also that of the *epistyle*, and consequently include the breadth of the triglyph. The height of the capital of the triglyph is one-seventh of its whole height, and the capital of the metope one-ninth. The breadth of the triglyph is divided into nine equal parts, giving two to each *glyph*, one to each semi-glyph, and one to each of the three inter-glyphs.

The metopes are square. The height of the cornice is divided into five equal parts; the lower is given to the fillet, the mutules, and drops; the next two to the corona; and the remaining two parts are subdivided and disposed among the members.

The projection of the cornice is equal to its height; it is divided into four equal parts, giving three to the projection of the corona.

The number of annulets in the capital vary from three to five; and the number of horizontal grooves, which separate the shaft from the capital, vary from one to three.

In the application of the Doric order to temples, the shafts of the columns are generally placed upon three steps, which are not

proportioned like those in a common stair, but to the magnitude of the edifice.

Water Spout on the Lake of Geneva.—M. Mayor, who resides at Mollard Place, Geneva, in looking through his window, which faces the lake, saw, to his astonishment, on the third of December last, about a quarter before eight in the morning, in the direction of *Paquis* and *Secheron*, a vertical column of water, at least sixty or eighty feet high, and several feet in diameter, larger at its base than its summit, of a grey color, and appearing animated with a gyratory motion. The column rested on the lake below, and was bent towards the top in the form of a bow. It remained nearly two minutes without any sensible change of place; and then sunk, by degrees, from above, by diffusing itself in a shower of rain. At this juncture a south-west wind ruffled the surface of the lake; the sky was entirely covered with thick vapors, which occupied the upper regions, while there were, properly speaking, no clouds in the horizon.

This is not the first spout seen on Lake Leman. One which occurred in 1741 was described in the French Academy. It lasted several minutes. Another was seen in 1764, in the month of August, which continued nearly an hour.

In the spout witnessed by M. Mayor, the top of the column had no communication with thick clouds, as is sometimes the case, no trace of any such cloud was to be seen, neither above the column nor in its neighborhood,—hence there were no indications of electrical attraction to which the effect could be attributed, and there seems no means of accounting for the prodigious force then exerted to sustain a column of water of such height, except that which ascribes it to a current or whirlwind of excessive intensity.—[Bib. Univ. 1833.]

Force of Instinct.—Mr. Southey, in his History of Brazil, thus describes the perilous situation of Cabeza de Vaca, who, sailing towards Brazil, was preserved from shipwreck by a grillo, or ground cricket: "When they had crossed the line, the state of the water was inquired into, and it was found that of a hundred casks there remained but three to supply four hundred men and thirty horses: upon this the Adelantado gave orders to make the nearest land. Three days they stood towards it. A soldier who set out in ill health had brought a grillo, or ground cricket, with him from Cadiz, thinking to be amused by the insect's voice; but it had been silent the whole way, to his no little disappointment. Now, on the fourth morning the grillo began to ring its shrill rattle, scenting, as was immediately supposed, the land. Such was the miserable watch which had been kept, that upon looking out at this warning they perceived high rocks within bow-shot, against which, had it not been for the insect, they must inevitably have been lost. They had just time to drop anchor. From thence they coasted along, the grillo singing every night as if it had been on shore, till they reached the isle of St. Catalina."

Patent granted to David Redmund, London, for Improvements in the Steam Engine. [From the Repertory of Patent Inventions.]

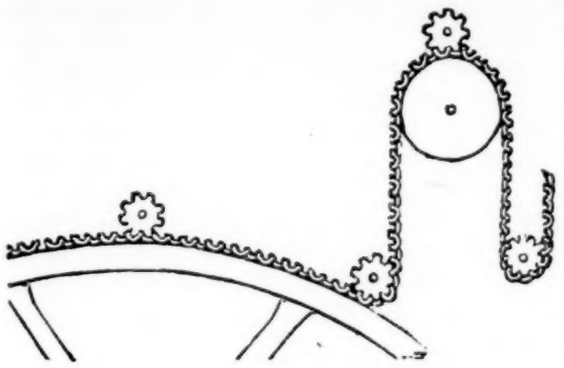
This invention has to do with the boiler only. It is portable, and intended to suit any fire-place that it might be applied to in domestic or other purposes. It consists of a series of chambers exposed to the action of heat by a corresponding series of flues.

The chambers are made of rolled copper or other suitable metal. The side pieces are formed into semi-circular half tubes, separated from each other by sharp doublings of the metal, so as to present alternate semi-circles and acute angles in the edge. Resting on the frame, it appears to be supported by so many arches, which give it strength and solidity. These side pieces are so constructed that the points of one shall meet the centres of the semi-circle in the other: the ends of these side pieces being made to overlap each other from the ends of the chambers.

The top is of rolled metal, and hollowed, or channelled, or fluted, as the side pieces; the bottom is of cast metal and troughed out in a corresponding manner. When two of these chambers are placed together, the semi-circular flutings form complete tubes, and while the chambers have direct access to the supply of water, and unite in a common egress for the escape of steam, the tubes or flues have a similar communication with the source of heat, and its circulation is similarly promoted.

The whole is fixed in a very strong case of iron for the prevention of accidents, and the increase of heat. The patentee prefers a fire, the bars of which are semi-cylindrical tubes.

The claim is made for the boiler as above described.



GEARING CHAIN.—An ingenious and useful construction of gearing chain for connecting cog-wheels, has lately been invented by Mr. Oldham, engineer, of the Bank of Ireland, which we think highly deserving of the attention of machinists, as it is so extensively applicable to various kinds of machinery, such as carding engines; and indeed in almost every situation where a series of toothed wheels are required to be driven by one mover. It consists of a peculiarly constructed chain, with curved links, which when passed round a drum will serve as teeth, and act as a cog-wheel to turn pinions, &c.; and when stretched out straight, or placed on a flat surface, will form an endless rack. It may also be passed over and under a series of rollers, pinions, &c., forming a carrying-chain, instead of the commonly constructed chains, in which spiked wheels are employed to take in the links.

In carding engines, and various other kinds of machinery, this improved chain will work with much better effect in connection with pinions, or wheels with common teeth, into which it is suited to gear, than the old chains, and without the possibility of slipping off, or riding over the points of spiked wheels, having a broader surface of contact; and it is not at all liable to get out of order, being much stronger than the old linked chain used with spur pinions.

It is formed by crescent-shaped plates constituting links, which are connected together; and one and two plates alternately, or two and three, or more, placed side by side; the alternate links fitting in between each other at the joints, where they are connected by pins, or bolts, passed through their eyes in lateral directions.

It will be obvious that these curved links present on one surface of the chain semi-circular hollows like a rack, for the teeth of the pinions to take into, and that the ends of the links, where the bolts or rivets are passed through, are also formed semi-circular, and the same size as the spaces or hollows of the links. These ends constitute teeth on the chain, and take into the spaces between the teeth of the pinions or wheels, and consequently drive them; or the chain itself may be driven by such pinions or wheels in the same way as a rack.

It is evident that such a chain may be passed in various directions over wheels, on its face, and over drums at its back, and may be used with certainty of effect: as whatever motion is given to the chain will be communicated to all that is in gear with it.

The accompanying engraving shows such a chain, supposed to be endless, carried over part of the periphery of a carding cylinder, and constituting a circular rack or toothed rim, which drives all the pinions connected to it; the back of the chain is conducted over a roller, and brought into gear with other pinions or wheels; but as numerous illustrations might be produced of its applicability, it is unnecessary to say more, as its adaptation to every wide range of machinery will at once be perceived by every practical mechanic.—[British Cyclopædia.]

HOW TO ENDURE POVERTY.—That a thorough, religious, *useful* education is the best security against misfortune, disgrace, and poverty, is universally believed and acknowledged; and to this we add the firm conviction, that when poverty comes, (as it sometimes will,) upon the prudent, the industrious, and the well informed, a judicious education is all-powerful in enabling them to *endure* the evils it cannot always *prevent*. A mind full of piety and knowledge is always rich; it is a bank that never fails; it yields a perpetual dividend of happiness.

In a late visit to the alms-house at ———, we saw a remarkable evidence of the truth of this doctrine. Mrs. ——— was early left an orphan. She was educated by an uncle and aunt, both of whom had attained the middle age of life. Theirs was an industrious, well ordered, and cheerful family. Her uncle was a man of sound judgment, liberal feelings, and great knowledge of human nature. This he showed by the education of the young people under his care. He allowed them to waste no time; every moment must be spent in learning something, or in doing something. He encouraged an entertaining, lively style of conversation, but discountenanced all remarks about persons, families, dress, and engagements; he used

to say, parents were not aware how such topics frittered away the minds of young people, and what inordinate importance they learned to attach to them, when they heard them constantly talked about.

In his family, Sunday was a happy day; for it was made a day of religious instruction, without any unnatural constraint upon the gaiety of the young. The Bible was the text-book; the places mentioned in it were traced on maps; the manners and customs of different nations were explained; curious phenomena in the natural history of those countries were read; in a word, every thing was done to cherish a spirit of humble, yet earnest inquiry. In this excellent family Mrs. —— remained till her marriage. In the course of fifteen years she lost her uncle, her aunt, and her husband. She was left destitute, but supported herself comfortably by her own exertions, and retained the respect and admiration of a large circle of friends. Thus she passed her life in cheerfulness and honor during ten years; at the end of that time, her humble residence took fire from an adjoining house in the nighttime, and she escaped by jumping from the chamber window. In consequence of the injury received by this fall, her right arm was amputated, and her right leg became entirely useless. Her friends were very kind and attentive, and for a short time she consented to live on their bounty; but, aware that the claims on private charity are very numerous, she, with the genuine independence of a strong mind, resolved to avail herself of the public provision for the helpless poor. The name of going to the almshouse had nothing terrifying or disgraceful to *her*, for she had been taught that *conduct* is the real standard of respectability. She is there with a heart full of thankfulness to the Giver of all things; she is patient, pious, and uniformly cheerful. She instructs the young, encourages the old, and makes herself delightful to all, by her various knowledge and entertaining conversation. Her character reflects dignity on her situation; and those who visit the establishment come away with sentiments of respect and admiration for this voluntary resident of the almshouse.—[Frugal Housewife.]

Instruction and Amusement are more blended than the world in general is apt to imagine. Uninstructive amusement may be afforded for a moment by a passing jest or a ludicrous anecdote, by which no knowledge is conveyed to the mind of the hearer or the reader; but the man who would amuse others for an hour, either by his writing or his conversation, must tell his hearers or his readers something that they do not know, or suggest to them some new reflection upon the knowledge they have previously acquired. The more the knowledge bears upon their pursuits, upon their occupations, or upon their interests, the more attractive it will be, and the more entitled to be called useful.

Manufactures of Manchester—Visit to Chatsworth, the Seat of the Duke of Devonshire.

By B. P. [From the New-York Farmer.]

The town of Manchester (for although it has a population of 100,000 and upwards, it is still a town,) contains manufactories, principally of cotton goods; though, in the neighboring towns, all the different kinds of cloth, &c. are got up, so that Manchester is headquarters for purchasers of all descriptions of cotton and woollen fabrics. To attempt a description would be worse than useless. Any one, however, that would expect to see in one of those establishments the raw material taken in, and the goods in a finished state turned out, would be disappointed; although that is done almost universally in the United States, still, here, it is divided into many branches, and a separate owner and manager for each branch. Manchester is so much surrounded by mountains, that it is said it rains 300 days in each year.

There are several very ancient buildings in Manchester, particularly the old Collegiate Church, which was built in the fifteenth century, and near which is the Monastery, now appropriated to the education of 80 boys, who, at 14 years of age, are apprenticed to some useful employments. There is a Library connected with it containing 15 to 20,000 volumes, and also many ancient relics, shown visitors by the boys in rotation, for which you are expected to give a few pence. The old Church is ornamented with many rude carvings and statues, that, to an American, who had never seen the like, was not particularly adapted to fix his attention to the service; but far otherwise,—as to look above you, and see seraphs playing on violins, will not add to the solemnity of a church.

Agriculture, in the vicinity of Manchester, is on a small scale. Gardening is, however, well attended to; in gooseberries and sallads, particularly celery, they exceed any section of England.

The ride across the mountains to Sheffield is any thing but interesting. You see the wild heath in great perfection, but there are too many of them. Sheffield, so famous for cutlery and plated ware of superior quality, is pleasantly situated. The show-rooms of Messrs. Rodgers & Son are splendid indeed; but any little article can be purchased at less price in America of equal value at retail.

Situated twelve miles from Sheffield is *Chatsworth*, one of the seats of the Duke of Devonshire. As he is the perfect plain gentleman, I will, however, give you some free remarks, describing, as well as I am able, his princely mansion. Near the inn at Edenson stands a Porter's Lodge, which commands one of the entrances into Chatsworth Park. From this entrance into the park the road ascends to a high point of ground, from whence the palace, (if it may so be called,) and its surrounding scenery are at first beheld. Descending from this elevated situation, you cross the river Derwent, upon a stone bridge, built from a design, as was said, of Michael Angelo. The House, as you approach, appears to great advantage. The noble amphitheatre of wood, by which this richly ornamented mansion is accompanied, has a grand and magnificent effect. The lofty foliage near the house is well connected with the remote hills by a succession of delightful scenery, which is terminated in the distance by the barren mountains of the Peak. The style of laying out gardens and pleasure-grounds having altered so much since the last century, that what would then have been highly praised, would now be universally condemned. I allude to the trim parterres and formal water-works which here abound.

Back of the garden is a long and narrow flight of stone steps, down which the water rushes by moving some machinery on the side of the mountain, without any break, winding, or interruption of any kind. There is also a temple surmounted with stone lions, &c. which, by a slight movement of machinery, spout water in fine style; as also a tree representing a willow, which, by the by, is made entirely of copper, and at a given signal emits water from every branch. These water-works are what has added much to the celebrity of Chatsworth; but although in good taste when constructed, are little thought of now. The irregular winding stream here and there showing itself in its passage down the mountain, now and then screened from view entirely by shrubbery, would be much more accordant to the present views of landscape gardening. The house is said to have been built in the reign of William III. It is composed of four nearly equal sides, with an open quadrangular court within, the principal front being highly ornamented. Two sides of the court have open balconies, guarded by stone balustrades, divided into different sections, ornamented by busts in stone of some of the most distinguished personages in the reign of Queen Anne. The middle of the court is occupied with a marble statue of *Arion*, seated on the back of a dolphin, and surrounded with the clear living waters of a fountain, which fall into a capacious basin, also formed of marble. The classical fable from which this is taken represents Arion, as a musician and poet of Lesbos: having acquired great fame in his own country, he travelled into Italy, and became rich by the exercise of his professional excellence. Returning homewards, full of the hope of enjoying in his own country the wealth he had amassed in another, the mariners that accompanied him were tempted to throw him into the sea, that they might possess themselves of his riches; in this extremity he requested permission once more to play upon his harp before he died. The request was granted; he struck the cords, and amidst a stream of music that astonished the mariners, he leaped into the sea, when a dolphin, charmed with the strains of his harp, caught him on his back, and, in return for the sweet music it had made, bore him safely through the waves to his home, where he arrived long before the vessel in which he had embarked—when he told the story of his danger and escape. The mariners on their examination acknowledged their murderous intentions, and as far as they were concerned in the transaction they confirmed the tale of the miraculous escape of Arion on the back of the dolphin.

On entering the grand hall, a spacious and noble room connected with a flight of steps to the grand staircase, it is useless to attempt a description of the fine paintings and statuary that every where meet your view; but I must not pass over the chapel, which, being finished mostly of cedar wood, the delightful fragrance whereof perfumes the building. This is a richly ornamented place; carving, painting and sculpture, have all been lavishly employed in decorating it. One painting, representing the incredulity of St. Thomas, is very fine and appropriate.

Many rooms in the palace are hung with ancient tapestry. The library is a splendid room, and bespeaks the taste of the present Duke, who has made extensive additions to it. Chatsworth was, for some time, the residence, or rather prison, of Mary, Queen of Scots—in remembrance of which a suite of apartments are still known by her name; and near the bridge by the side of the Derwent are the remains of an old building, called the Bower of Mary, Queen of Scots. A deep moat encompasses the area, where the tower stands, and a garden once occupied its summit, wherein that unfortunate princess, shorn of every semblance of royalty, was wont to spend the solitary hours of confinement.

The deer and various groups of cattle in the park, the fine mountain scenery, and, in fact, every thing one's eye rests on, is calculated to please, and enable the visitor to say, with Cunningham, in his Stanzas upon Chatsworth:

> But Chief, amidst thy proudly pendant groves,
> Majestic Chatsworth, and thy fair domains,
> The muse with loitering steps delighted roves,
> Or thoughtful meditates her cheerful strains.

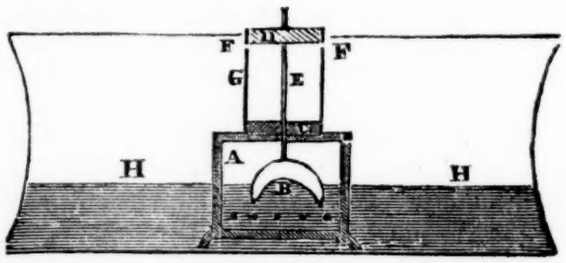
I must close this letter, which, I fear, you will not think interesting, as it is not an agricultural district here, being too mountainous for extensive cultivation.

Yours, &c. B. P.

Safety Apparatus for Steam Boilers. By F. H. [Communicated for the Mechanics' Magazine.]

Conceiving that there cannot be any invention more requisite than that of a safety apparatus for preventing the explosion of steam boilers, induced me most willingly to accept an invitation through a friend, to witness an experiment on a machine invented by Mr. Kennedy, of Fourth street, for that purpose, which, although tried on a small scale, evinced a capacity to embrace in the fullest sense a power to avert the awful calamity of the bursting of steam boilers. It is, on all hands, an admitted fact, that the cause of bursting or collapsing arises from a deficiency of water in the boiler; to ascertain the quantity, gauge cocks are used, which, at the most important time, are known to be uncertain, for, when the water is low, a quantity of it as condensed steam may yet remain in the cock, which, on opening, will cause a jet of water, that in too many cases satisfies the engineer. To obviate this, and to place the apparatus beyond the control of any person after it is fixed in the boiler, to simplify its formation and actions, and do away with the gauge cock, is evidently the object of the inventor, to which points he has certainly arrived, and which are fully demonstrable by the annexed engraving and reference.

Mr. Kennedy, agreeably to request, having communicated his plan to the Secretary of the United States Treasury, conceives that he has done his duty, and awaits the result. I have a different opinion, and, having obtained his permission, I wish through your useful magazine to lay a description of it before the public, with a desire to form a company which would put the apparatus into full operation, and probably save the lives and property of thousands.



This shows the interior of the boiler, also of the apparatus. A is a box containing the float. B the concave float, (concave at bottom and convex at top). C, soap-stone. D, a wadded stopper, connected by a rod, E, with the float, which, when lowered by the sinking of the float below the holes F, in the upper part of the tube, admits the steam to rush out, which will show the want of water in the boiler, agreeably to the adjustment between the float and stopper. G is a tube attached to the box A, and passes through the upper part of the boiler, in which the stopper acts, and at the top of which are four holes exactly opposite each other, through which the steam rushes when the water becomes low in the boiler.

The reasons assigned by Mr. Kennedy for adopting this peculiar formation of the apparatus are,—first, in order to prevent ebulition affecting the float, he incloses it in a box, A, and admits water to it through the sides, not at top or bottom; second, it being well known that the gasses connected with steam will cause a firm adhesion of any metals which touch each other, and which are exposed to steam, he therefore substitutes soapstone for the guidance of the rod which connects the float and stopper: this being completely saturated with oil in the first instance, and kept so by a small additional supply

through the stopper, along the rod E, insures a certain action. The holes at the top of the tube being directly opposite each other, neutralize the power of the steam, and prevent any partial pressure on the stopper. A concave float will retain rarified air or steam, which will promote its buoyancy, but which never can elevate it beyond the surface of the water.

This plan is evidently void of complexity, either in its working or formation, having but one simple operation; therefore, in every respect highly commendable. F. H.

Natural Magic.—In a former number we noticed a work on Natural Magic, in which the word Magic is applied to those phenomena which appear remarkable at first, but which can be satisfactorily explained. The first meaning of the word supposed a commerce with evil spirits; when this ceased to be believed by philosophers, some of them applied the term to every thing wonderful in nature, or which they were not able to explain. In this sense is the word used in the "Natural Magic" of Baptista Porta, from which we shall make a few extracts, that our readers may know how much the world has gained in the last two centuries. Let any man reflect for a moment on the fact, that the generation which swallowed the absurdities here quoted, considered itself so wise, that it made an erroneous opinion a capital offence.

John Baptista Porta was a Neapolitan philosopher of the sixteenth century, and died in 1615. He was a diligent inquirer into all the works of nature, and wrote treatises on various subjects. In his day it must not be supposed that natural philosophy was altogether such as it is in ours, in the manner of cultivating it. Hard words, with an extract from a Greek author, were considered as sufficient for the explanation of any fact. Baptista Porta's celebrated work, Natural Magic, was written in Latin; but for the convenience of our readers, we take our extracts from an English translation, published in the year 1658. We give the spelling just as we find it, in order that many who have never read an old book may see how little their language has changed its orthography in nearly two centuries. By magic the author does not mean dealing with evil spirits; in his own words, "There are two sorts of magick: the one is infamous and unhappie, because it hath to do with foul spirits, and consists of inchantments and wicked curiosity; and this is called Sorcery; an art which all learned and good men detest; neither is it able to yield any truth of reason or nature, but stands merely upon fancies and imaginations such as vanish presently away, and leave nothing behinde them—the other magic is natural, which all excellent wise men do admit and embrace, and worship with great applause." A magician must be "an exact and a very perfect philosopher"—a physician, a botanist, a mineralogist, a distiller (we should now say a chemist), a mathematician, and an astrologer (or astronomer). "Lastly, the professor of this science must also be rich: for if we lack money, we shall hardly work in these cases: for it is not philosophy that can make us rich; we must first be rich that we may play the philosophers." We shall now see how our author plays the philosopher. Many of his notions are borrowed from Pliny, Aristotle, Pythagoras, and others of the ancients.

"There is a wonderful enmity between cane and fern, so that one of them destroys the other. Hence it is, that a fern root powned, doth loose and shake out the dart from a wounded body, that were shot or cast out of canes." "The ape of all other things cannot abide a snail: now the ape is a drunken beast, for they are wont to take an ape by making him drunk; and a snail well washed is a remedy against drunkenness." "The wolf is afraid of the urchin" or hedgehog; "*thence*, if we wash our mouth and throats with urchines blood, it will make our voice shrill, though before it were hoarse and dull like a wolves voice." "The hart and the serpent are at continual enmity: the serpent, as soon as he seeth the hart, gets him into his hole, but the hart draws him out again with the breath of his nostrils, and devours him: hence it is that the fat and the blood of harts, and the stones that grow in their eyes, are ministred as fit remedies against the stinging and biting of serpents." "There is an antipathy between sheep and wolves, and it remains in all their parts; so that an instrument strung with sheep strings, mingled with strings made of a wolfs gut, will make no musick, but jar and make all discords." "The pomegranite will bring forth fruit just so many years, as many daies as the moon is old when you plant it." "If we cut our hair, or pair our nailes, before the new moon, they will grow again but slowly; if at or about the new moon, they will grow again quickly." "Bears eyes are oft times dimned; and for that cause they desire ho-

neycombs above all things, that the bees stinging their mouths, may thereby draw forth together with the blood, that dull and grosse humour; whence physicians learned to use letting blood, to cure the dimnesse of the eyes." "If you would have a man become bold or impudent, let him carry about him the skin or eyes of a lion or a cock, and he will be fearlesse of his enemies; nay, he will be very terrible unto them. If you would have a man talkative, give him tongues, and seek out for him water frogs, wilde geese, and ducks, and other such creatures, notorious for their continual noise-making."

It must not, however, be presumed that our author believed every thing which he found in a book; he sometimes exercises a judicious discretion. Thus of one good story he says, "this was a kind of moon-calf," and of the well known story of the basilisk killing all who look upon him, he says boldly, "this is a stark lie." The following is his account of the loadstone: "I think the loadstone is a mixture of stone and iron, as an iron stone, or a stone of iron. Yet, do not think the stone is so changed into iron as to lose its own nature, nor that the iron is so drowned in the stone but it preserves itself; and whilst one labours to get the victory of the other, the attraction is made by the combat between them. In that body there is more of the stone than of iron; and therefore the iron, that it may not be subdued by the stone, desires the force and company of iron; that not being able to resist alone, it may be able by more help to defend itself. For all creatures defend their being; wherefore, that it may enjoy friendly help, and not lose its own perfection, it willingly draws iron to it, or iron comes willingly to that."

With this most ingenious explanation, we take our leave of Baptista Porta.

Daniel Webster.—The following extracts from Mr. Webster's speech at Pittsburg will be perused with interest by many of our readers. The mechanic and artizan of this country have a firm and a talented advocate of their rights and independence in this gentleman. He is anxious that they should occupy that station in society which they are entitled to—that education should be liberally diffused among them—that they should be protected from the *pauper* labor of other countries—and, in fact, that they should enjoy all those blessings which the constitution affords, and which, forming as they do the very "bone and sinew" of the nation, they have a right to expect.

"I have said that I am in favor of protecting American manual labor,—and after all that has been said, I have come to the conclusion that, to leave American manual labor to bear a competition with the unpaid and half fed labor of Europe, would produce a state of things to which our country can never submit. This is the reason why I maintain the policy of the American system. I see in my own country, and I believe it is the same in this, that its stimulus to labor has been its offering a fair compensation for labor. When I say our country, I mean from Penobscot to New-Orleans; for nine-tenths of the whole belong to the industrious, productive, laborious classes. Dead capital is in but few hands; and this system does not promote the interests of the capitalist one-tithe part that it does those of the laborer, the industrious man who oversees, or labors upon the capital of another. Is it not this great stimulus which now applies itself to our whole society, and sets so many wheels in motion? Is it not the compensating price of labor—is it not that labor is high and the means of living low? I want no other proof, that God has blessed us with a happy country and generation.

"Suppose we compare ourselves with other countries—I see many whom I know to be emigrants from other countries. Why is the native of Ireland among you? Why has he left the land of his fathers? The Emerald Isle is as dear to him as these rivers and hills are to you. Was it not taxation on one hand, and the low price of labor on the other, that induced him to come to a country of free laws, and of boundless extent, where industry has its reward—where the means of living are low, and the price of labor adequate? And do not these remarks apply to the emigrants from every part of Europe? Is it not that industry and personal character can do more for a man here, than in any other part of the world?

"Our government is the breath of the people's nostrils; they make it, and they appoint agents to administer it. The people are the source of the power of our government; and is it not clear that it is unsafe to trust the affairs of government in the hands of the people, unless the great majority of the people have some interests in the government? Who would be safe in any community, when the power is in the hands

of those who have nothing at stake? It is the true policy of our government to shield the great body of the people—the productive classes.

"Gentlemen, it appears to me so plain a proposition, that the interest of this country ought to be protected, and must be protected, against the pauper labor of England and other parts of Europe, that argument is superfluous. Were it not for trespassing upon your patience, I would state as a historical truth—for it is beyond all question—that a leading object of establishing the constitution was to devise a system of laws to protect artizans against the cheap pauper labor of Great Britain. In the town in which I live, it is as notorious as the revolution itself.

"Soon after the peace of '83, there came on a period of distress over the whole Atlantic coast, far exceeding any thing that had been felt during the war. Importation in British ships was free—American ships there were none. The cheaper labor of England supplied the inhabitants of the Atlantic coast with every thing, from the crown of the head to the sole of the foot. The merchants of Boston appointed a committee, at the head of which was the name ever venerable to the mind of all Americans, John Hancock, by whom strong resolutions were reported, declaring that the inhabitants would not use any article imported in British ships. The mechanics of Boston met and recommended the inhabitants not to use British articles *at all*. [Great applause.] 'For,' said they, 'with regard to you, Mr. Hancock, what odds does it make whether our shoes, boots, hats, handkerchiefs, or shirts, come in British ships, or American ships—they take away our bread, come in what ships they may.' This state, the state of Massachusetts, and even the state of Virginia, passed laws to protect their own people by impost. But it could not be effectually done. One state would pass a law—another would not—there being no general system, there could be no protection. And it is a historical truth, plain beyond doubt, that our great object, along the Atlantic coast, in adopting the constitution, was that, by establishing a regular and uniform system of imposts, the various artizans and handicrafts might be permitted to earn their bread. There were, at that time, no manufactories in the interior, for there were no inhabitants. Here was Fort Pitt—upon the map, to be sure—but not peopled. Among the mechanics—the workers in leather, tin, iron, &c. there was a greater depression and poverty than there had been during the war. And I hope you will pardon me for another anecdote which is brought to my recollection. Massachusetts was the ninth state to adopt the constitution. If she adopted it, it would go into effect; but it was matter of great doubt whether she would. The mechanics of Boston met and passed resolutions. They said it was *necessary* for *them*. They elected delegates to adopt the constitution. Their proceedings were communicated to Samuel Adams. He had doubts—he was a friend of liberty, but he had honest and sincere doubts about the practicability of a general government. Paul Revere, a worker in brass, read to him the resolutions of the mechanics. He was asked how many mechanics passed these resolutions—(the meeting was held at the old Green Dragon)—was the room full? Oh yes, overflowing. Were there any in the street? Many. How many? More than the stars of heaven. [Laughter and applause.]

"It was thus the constitution of the United States was carried. Any gentleman desirous of pushing the historical inquiry, will find that the great and prevailing interest was where there were merchants and mechanics. There was a natural hesitation about the adoption of the constitution; and it was only urged through by the interests to which I have reverted. * * * * *

"One word more, gentlemen, and I have done.

"The Mayor has spoken of education: and can any man doubt, as a social being, as an immortal being, as a being interested in the world, that is, as a being vastly more interested in that which is to be,—that education is the general business of man? I take not back one jot or tittle of the expression. Education, the formation of the mind and character, by instruction in knowledge, and instruction in righteousness, is the great end of human being.

"Gentlemen, it is most gratifying to witness the attention which has been aroused, not confined to latitude or longitude, upon this subject. In the progress of some five or six weeks in the state west of you, and a part of the time in your own state, I have marked it with delight. The western world, or whole west, is full, beyond all comparison full, of aptitude and claims to instruction. The country is young, and settled with parents who have many children, whose means

are not affluent, but who eagerly seek education. The demands are fast increasing, and becoming more and more urgent and imperative.

"Under free institutions, literature, knowledge, and morals, might well be expected to flourish; but we are setting the great example which all Europe may look upon with astonishment, that, with popular institutions, and under a system of absolute toleration, we see no indifference to the great cause of *Religion*. We have denied a political sanction to any sect; yet places of worship are seen to spring up in every direction and of every denomination. Toleration begets no indifference; but zeal, rather than indifference. It is connected with education, with the intellectual and moral culture of the mind; and wheresoever men meet to worship the God of their fathers, I wish them the means of instruction, and the means of adequately conducting the great and good work."

CURIOUS CUSTOM AMONG MAHOMEDANS.—It is said that amongst the Mahomedans the following curious custom is observed: They never destroy any fragment of paper, however small, which chance may place in their way. For this custom, which may appear in its practice to be ridiculous, a remarkable reason is assigned: "It is the duty," say the Mahomedan teachers, "of every true believer, to throw away no opportunity of communicating to his fellow-creatures a knowledge of the one God and of his Prophet. The few words which express the short and comprehensive article of our faith may be written on any the smallest fragment of paper: let not true believers lose this opportunity which Allah himself presents to them! neglect not, destroy not that fragment. Let the word of the Prophet be written upon it, and the winds of Heaven will, under the direction of Providence, convey it into the hand of some one whose memory needs to be refreshed from the fountain of truth, or whose mind's eye hath not seen the light of Heaven."

In the desire, and certainly in the power of enlightening their fellow-creatures, the Christian need fear no comparison with the Mahomedan world; but in the mode of accomplishing this object, the custom alluded to affords a lesson for study, and an example for imitation.

INATTENTION.—In most cases our habits of inattention may be traced to a want of curiosity; and therefore such habits are to be corrected, not by endeavoring to force the attention in particular instances, but by gradually learning to place the ideas which we wish to remember in an interesting point of view.—[Dugald Stewart.]

Hints for the Packing up of Machinery, and preserving it in working order. [From the London Mechanics' Magazine.]

Extract from a letter from James Watt, Esq., of Soho, to John Barrow, Esq., of the Admiralty, London:

"Before sending off the materials of engines, the bored or turned cast iron parts are all well greased, and the latter wrapped with rope-yarn, and the outside of the castings receive a coat of oil paint; the polished wrought iron work is well greased and packed in boxes with dry saw-dust. The precautions do not, however, prevent rust for any great length of time; this was experienced in the materials of his Majesty's steamer, the Alban, which we delivered at Deptford yard, in May or June, 1826; but the vessel not being ready, the boxes with the wrought iron goods were deposited in what appeared to be a dry storeroom, and, as far as I recollect, the saw-dust removed. On proceeding to erect the engines some six months afterwards, the wrought iron work was found to be much corroded by rust, and the repolishing and refitting was attended with considerable expense and loss of time. We find also that in our hands here, when similar materials are laid by for any length of time in the driest rooms we have, they require repolishing. This would be the case if the engines were erected, but we do not think the expense incurred in keeping the parts in order would be much increased;* indeed, I have adopted this plan myself in an iron work belonging to me, where I have had occasion to increase the power without the hope of letting it out in the present time. . . . . If the engines are not to be erected, the boxes should be immediately opened, the saw-dust removed, and all the wrought iron work well cleaned and fresh greased. It should be kept in a dry storehouse, and, if possible, in one occasionally heated; the cylinders, air pumps, &c. should also be cleaned out and fresh greased, and all the castings, as well as the boilers, should be put under sheds, to protect them from the wet, &c."

* The meaning is here somewhat obscure; but we understand it to be, that the expense of keeping an engine in good working order, by having a person to attend to it, and working it occasionally, is not much more than the cost of repolishing and refitting.—ED. M. M.

Fig. 1

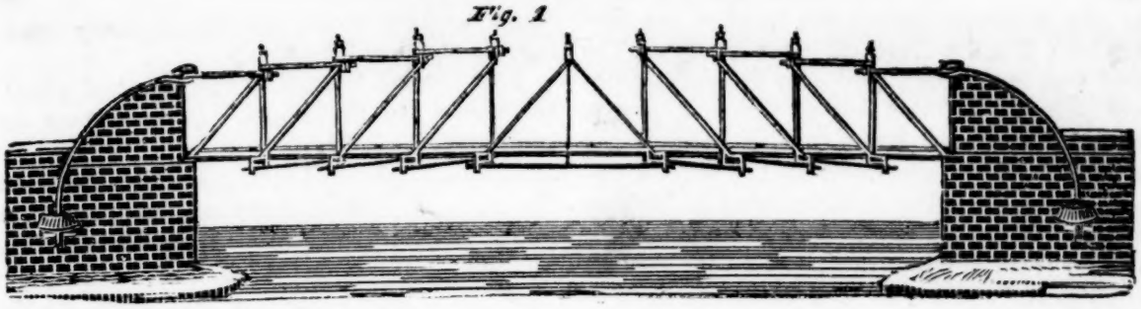


Fig. 2

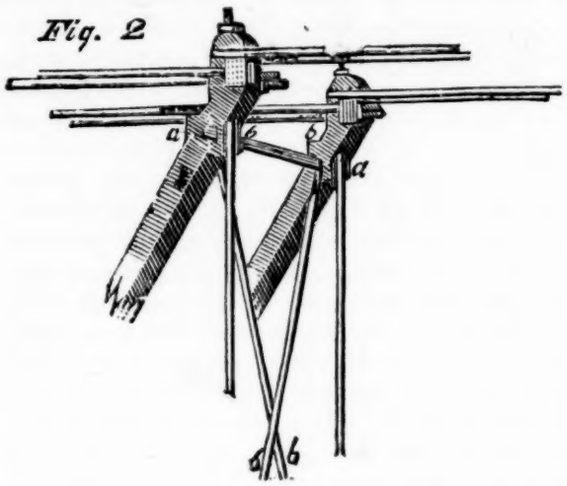


Fig. 3

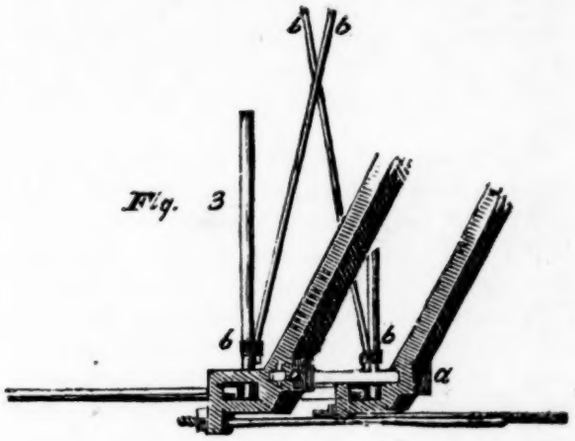
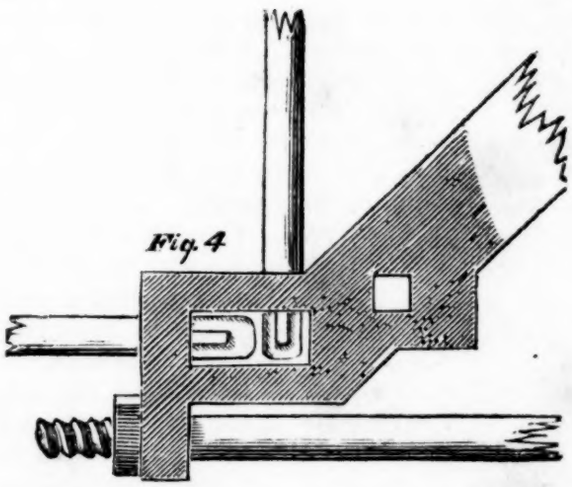


Fig. 4



Mr. A. Canfield's Description of his Iron Tension Bridge. [Communicated by the Inventor for the Mechanics' Magazine.]

Fig. 1 is a projection or side view of the bridge. Figs. 2 and 3, parts of one frame in perspective. Fig. 4, projection of the foot of the brace.

The upper horizontal pieces are called the upper strings. The lower horizontal pieces the lower strings. The upright pieces the posts. All these may be either chains or bars. The oblique pieces are the braces. On each side of the road-way the frame is double, that is, it has a double set of braces, &c. in order to have a wider base at the abutment.

The bars connecting the braces are the cross-bars, see *a a a a*, Figs. 2 and 3. The pieces running from the ends of the upper cross-bars to the lower end of the post on the opposite side of the frame are called the lateral braces, see *b b b b*, Figs. 2 and 3. The upper strings are double, and pass round the head of the first brace, and are secured with screws and nuts at the head of the second brace. The pieces are supposed to be numbered 1, 2, 3, &c. from the abutments.

The first upper strings are firmly attached

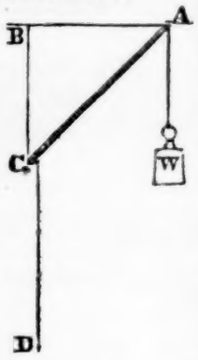
to the abutment and to the head of the first brace. To the head of the first brace the first post is attached, and also the second upper string. To the foot of the first post is keyed the second brace. The head of the second brace is sustained by the second upper strings, running from the head of the first brace. The foot of the second brace is prevented from moving horizontally by the second lower strings, so that when the span is complete the upper strings are acted on by a direct tension from the abutment, and the lower strings by a tension from the middle of the span. The floor, of either iron or wood, to be supported by the lower cross-bars.

The upper strings, from the head of the centre braces to the next brace on each side, may be left out, as there can be no stress on them; and also the lower strings, from the abutment to the foot of the second brace. This leaves all the iron at liberty to contract and expand without the least strain on any part. It is proposed to connect the parts last referred to by a spiral spring, that will yield an inch or two, with a tension of one or two tons.

You will observe that there can be not the slightest vertical motion in the bridge without an absolute *stretching* of the iron. In addition to the lateral braces in the frames, all the lateral bracing may be put in as in any other construction; and to give it any longitudinal movement, the frames of one half the span must be actually *raised up*, turning on the head of the first brace as a centre.

In estimating the strength, and also the stress from the weight of the bridge, I refer to only one side, or one half the span. Of all the results that I have seen, of experiments on the strength of iron, the lowest is 25 tons as the strength of a bar an inch square. Emerson says "34 tons may be safely suspended on a rod of iron an inch square." I suppose it will sustain 25 tons; and suppose a bridge of 80 feet span, or ten braces, each extending over eight feet, and that the upper strings at the abutment are *two* inches in the section, (a little less than one and a half inch round iron,) each string then will sustain twice 25, equal to 50 tons. But as the stress is on four of them, (that is, two on each side of the road-way,) the strength of the first braces will be 50 tons, multiplied by 4, equal to 200 tons; the second brace will sustain one half of this, equal to 100 tons; the third brace one-third, equal to 66·6 tons; the fourth brace one fourth, equal to 50 tons.

This (fourth brace) is the point of great est stress, for the centre has its support on each side.



To estimate the stress on the abutment, suppose B A to be the upper string, A C the brace, W a weight suspended at A. Now, as the brace is at an angle of 45 degrees, the weight W causes a *horizontal* pressure at C, exactly equal to the tension on B A. Suppose now 50 tons on the fourth brace, or at the centre of the bridge, the tension on the B A, or the first brace, will be 200 tons. The horizontal pressure at C is the same. Then, the power acting to turn the abutment on the point D is the difference of the products of 200 tons multiplied into D B, and 200 tons into D C. B C is 8 feet. Suppose D C to be 16 feet, or two-thirds of B D: then 200 tons, minus two-thirds of 200 tons, gives 66·8 tons for the stress on the abutment. This acts with a leverage of 24 feet.

I have here taken the extreme weight, which is of course many times greater than would ever be put on the bridge. The stress at the abutment from the weight of two frames, without the floor, is 7 1-9 tons. On a pier the pressure would be vertical only.

The cost of three frames, (that is, of a bridge with two road-ways,) would be $2,362. This is a matter of certain and simple calculation, by reducing the contents to cubic inches and pounds.

In making this estimate I take the first brace 4 inches square; the upper strings (double) and 2 inches in the section, and all the parts diminishing in a much less ratio than the stress upon them. All the parts diminish towards the centre excepting the lower strings. The stress upon them being greatest at the centre of the span.

The braces (of cast iron) weigh 23,224 pounds. The other parts of wrought iron weigh 15,013 pounds. The castings can be obtained at 5 cents the pound, and the wrought iron at 8 cents.

In this construction the iron acts only in the direction in which it has the *greatest* strength, viz. a direct tension or a direct thrust, there being not the slightest lateral strain. The stress upon each part from any given weight is a matter of simple calcula-

tion. Each piece may be proved before it is used. The contraction and expansion are effectually provided for, and it appears to possess every requisite in a bridge.

AUG. CANFIELD.

Paterson, N. J., June 12, 1833.

Heights of the Principal Mountains in the World, expressed in English Feet. [From the Artizan.]

Those marked with the letter B have been determined by the barometer; and those marked with the letter G, by geometrical operations.

Snæ Fiall Jokul, on the north-west point of Iceland	4,558 B
Hekla, volcanic mountain in Iceland	3,950 G
Pap of Caithness	1,929
Ben Nevis, Inverness-shire	4,380 B
Cairngorm, Inverness-shire	4,080 B
Ben Lawers, Perthshire	4,015 B
Ben More, Perthshire	3,870 B
Schihallien, Perthshire	3,281 G
Ben Ledi, Perthshire	3,009 B
Ben Lomond, Stirlingshire	3,240 B
Lomond Hills, east and west, Fife-shire	1,466 and 1,721 G
Soutra Hill, on the ridge of Lammer muir	1,716 G
Carnethy, highest point of the Pentland ridge	1,700
Tintoc, Lanarkshire	1,720 B
Leadhills, the house of the Director of the Mines	1,564
Queensbery Hill, Dumfries-shire	2,259 G
Dunrigs, Roxburghshire	2,408 G
Elden Hills, near Melrose, Roxburghshire	1,364 G
Crif Fell, near New-Abbey, in the Stewartry of Kirkcudbright	1,831 G
Goat Fell, in the Isle of Arran	2,950 B
Paps of Jura, south and north, in Argyllshire	2,359 and 2470
Snea Fell, in the Isle of Man	2,004 G
Macgillicuddy's Reeks, county Kerry	3,404
Mourne Mountains, County of Down	2,500
Helvellyn, Cumberland	3,055 G
Skiddaw, Cumberland	3,022 G
Saddleback, Cumberland	2,787 G
Whernside, Yorkshire	2,384 G
Ingleborough, Yorkshire	2,361 G
Shunnor Fell, Yorkshire	2,329 G
Snowdown, Caernarvonshire	3,571 G
Cades Idris, Caernarvonshire	2,914 G
Beacons of Brecknock	2,862 G
Plynlimmon, Cardiganshire	1,540 G
Penmaen Mawr, Caernarvonshire	1,540 G
Malvern Hills, Worcestershire	1,444 G
Cawsand Beacon, Devonshire	1,792 G
Rippon Tor, Devonshire	1,549 G
Brocken, in the Hartz forest, Hanover	3,690
Schneekopf, in Silesia	4,950
Priel, in Austria	6,565
Peak of Lomnitz, in the Carpathian ridge	8,640
Mont Blanc, Switzerland	15,646 G
Village of Chamouni, below Mont Blanc	3,367 G
Jungfrauhorn, Switzerland	13,730
St. Gothard, Switzerland	9,075
Hospice of the Great St. Barnard, on the passage to Italy	8,040 B
Village of St. Pierre, on the road to Great St. Barnard	5,338 B
Passage of Mont Cenis	6,778 B
Ortler Spitze, in the Tyrol	15,430
Rigiberg, above the lake of Lucerne	5,408
Dole, the highest point of the chain of Jura	5,412 B
Mont Perdu, in the Pyrenees	11,283
Loneira, in the department of the high Alps	14,451
Peak of Arbizon, in the department of the high Pyrenees	8,344
Puy de Dome, in Auvergne	5,197
Summit of Vancluse, near Avignon	2,150
Soracte, near Rome	2,271 G
Mont Velino, in the kingdom of Naples	8,397 G
Mount Vesuvius, volcanic mountain near Naples	3,978
Ætna, volcanic mountain in Sicily	10,963 B
St. Angelo, in the Lipari islands	5,260
Top of the Rock of Gibraltar	1,439 B
Mount Athos, in Rumelia	3,353
Diana's Peak, in the Island of St. Helena	2,692
Peak of Teneriffe, one of the Canary Islands	12,358 B
Ruivo Peak, the highest point in the island of Madeira	5,162
Table Mountain, near the Cape of Good Hope	3,520
Chain of Mount Ida, beyond the plain of Troy	4,960
Chain of Mount Olympus, in Anatolia	6,500
Italitzkoi, in the Altaic chain	10,735
Awatsha, a volcanic mountain in Kamschatka	9,600
Taganai, in th Uralian chain	4,912
The Volcano, in the Isle of Bourbon	7,680
Ophir, in the centre of the Island of Sumatra	13,842
St. Elias, on the western coast of North America	12,672

Chimborazo, highest summit of the Andes	21,440 B
Antisana, volcanic mountain in the kingdom of Quito	19,150 B
Cotopaxi, volcanic mountain in the kingdom of Quito	18,890 B
Tonguragua, volcanic mountain near Riobomba, in Quito	16,579 B
Rucu de Pichincha, in the kingdom of Quito	15,940 B
Heights of Assuay, the ancient Peruvian road	15,540 B
Peak of Orizaba, volcanic mountain east from Mexico	17,390 G
Lake of Toluca, in the kingdom of Mexico	12,195 B
City of Quito	9,560 B
City of Mexico	7,476 B
Silla de Caraccas, part of the chain of Venezuela	8,640 B
Blue Mountains, in the Island of Jamaica	7,431
Pelee, in the Island of Martinique	5,100
Morne-Garou, in the Island of St. Vincents	5,050
Mount Misery, in the Island of St. Christophers	3,711

MOUNTAINS IN THE EAST INDIES.

Himalay, or White Mountains	26,860
Yamunavaben, or Jamautri	25,500
Supposed Dhaibun	24,740

SIMPLIFIED APPLICATION OF STEAM.—At a meeting of the Paris Academy of Arts and Sciences, held on the 7th January, a memoir was read, in which M. Pelletan treated of the dynamic effects of a jet of steam, and the means of applying it, in a simple and cheap way, to the purposes of the useful arts. 'A jet of steam,' says the author, when thrown into a cylindrical conduit, or into a pipe filled with air, imparts the active power with which it is endued to the column of air, without any other loss than that occasioned by the friction in the conduit, or pipe.'

His detail of the results, which have already ensued from his discovery, are deserving of attentive notice. A jet of steam issuing through an orifice of a milimetre, (.03937 of an inch,) under a pressure of five atmospheres, possesses a velocity of five hundred and fifty-nine metres (1084⅜ feet) per second; it consequently moves at the same rate of velocity as a bullet discharged from a gun.

But this enormous velocity is, in its simple form, of no practical benefit, inasmuch as it cannot be converted into a useful agent; when, however, the steam has been enabled to impart motion to a quantity of atmosphere, the velocity, it is true, is diminished, but the mass set in motion is increased; and by this operation, the active power of the jet of steam is susceptible of general application.

The elastic force of steam has hitherto been employed under pressure, by the aid of machines, which are necessarily complicated, and involve a serious loss of power from their bulkiness and friction; but steam, acting immediately by its own power, can be made to effect its objects in machines of so simple a construction, that a steam engine of one man's power may henceforth be worked by a common fire.

Mr. Pelletan remarks, that the force of steam, so applied, may be brought directly in aid of the machine, and will enable him to double and treble his daily gains, instead of its powers being limited, as hitherto, to filling the coffers of great capitalists at a compound ratio.

The same jet of steam, when applied to the purpose of increasing the draft of furnaces, enables the proprietor to reduce their diameter to two inches, even where a large furnace is in question, to lead the smoke in any direction which may suit him best, and to make use of the whole heat produced. By means of this jet, a vacuum may be effected at will, in any given space, however considerable it may be, and permanently maintained, not only at very small cost, but through the medium of an apparatus of the simplest construction. This process is of ready application wherever evaporation or desiccation are to be effected. Acting upon a column of air, the jet supplies the simplest and most efficacious mode which can be adopted for creating blasts in forges, furnaces, &c.

It appears the inventor claims priority in this important discovery, inasmuch as he communicated the properties of the jet in a paper addressed to the Academy in 1829, and he is tenacious of the claim in consequence of the later application of the jet in impelling steam carriages in England.—[Athenæum.]

PRACTICAL MECHANICS might be very much improved, if the secrets of all trades were to lie open, and the several mechanics used in each trade duly explained; and experimental philosophy would be thereby much improved, as well as the trades themselves; and one trade might borrow many great helps in working, from another trade.—[Emerson.]

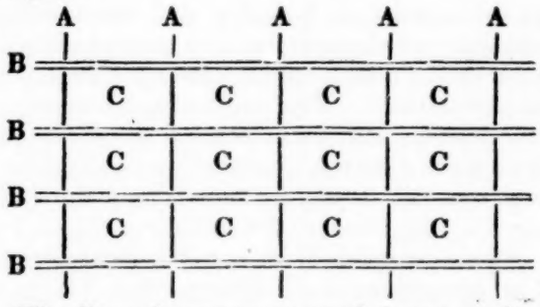
A *New Invention in Road-Making, with the Use of Timber.* By JOHN HARTMAN. To the Editor of the American Railroad Journal.

SCOTTSVILLE, Albemarle Co., Va.
July 4, 1833.

DEAR SIR,—Not having the pleasure of a personal acquaintance, but being assured by the Editor of the Virginia Farmer that you will take pleasure in noticing an invention in road-making with the use of timber, which, thus far, is considered as very valuable, I take the liberty of asking your attention to it.

The plan is one which is capable of demonstration, and will be found valuable in timbered countries, particularly where stone is not plenty; and where it is, and timber is equally so, and interest is allowed on the difference of cost, I have no hesitation in saying, that the use of timber will be preferable, either for flat or hilly countries.

I will give you a rough diagram and description, and then say a word more upon the subject.



The lines A represent good locust, cedar, oak, or other timber, of 10 or 12 inches diameter, of lengths to suit the road, laid across it, say 8 or 10 feet apart, rough, for the rails B to lie on, which should be good lasting timber, of from 15 to 20 inches diameter, sawed through the centre, with the edges hewed off, leaving a surface of from 10 to 15 inches, (further experiment must prove which is best, a wide or narrow rail,) bedded, and pinned or bolted down upon the sills A; and, upon the out edge of each, spike on scantling, say three inches square, as guides for the wheels, or upon each edge of the rails or timbers B, forming a groove for the wheels. I however consider the first plan best; then fill up the spaces C level with, or rather above, the rails B, for the horses; the wheels, of course, to run upon the rails B. When two tracks are put down, the space between them must also be filled level, so as to admit waggons, stages, carriages, &c. to pass from one track to the other, when necessary, as no impediment will present itself but the scantling, and that only on one side, which would amount to nothing, nor would the occasional crossing of this scantling injure it, as it would rarely or ever occur twice in the same place.

You see it is quite a simple plan. I will mention some of the advantages it offers for a new road, over M'Adamized, and particularly on hill sides. In the construction of a new road there is no necessity for grubbing, low cutting is quite sufficient. These timbers are put down on the surface of the ground; then, by cutting a ditch on each side of the road, earth enough is obtained to fill up the horse path or way, between the rails, which should be well rammed, or packed down, by a machine just invented for that purpose.

The elevation given, and the fact that it must be kept in shape, or together, by the timbers, which, with the side drains, will guarantee a good road, even in a marsh, for it is a known fact that it is the wheels of carriages and waggons, and not the horses' feet, which are so destructive to roads, by following always the same track, hence the collecting of water in them, and mud-holes. On hill sides the plan will be admirable, requiring the sills only to be levelled, either by large rough stone, where they are found plenty, as they frequently are on mountains; or timber may be substituted on the lower side, with a little digging on the other. You have the frame level; the earth then taken out on the upper side of the rail, to carry the water off, will fill up the track for the horses, which gives a perfectly smooth road, with less labor and expense generally than would be necessary for a single track of common turnpike, and no fear of its cutting up or wasting away by every rain. The side rails you see will effectually prevent the water from washing the road; and you see the facilities this plan gives for crossing gullies, forming culverts, &c. A double track can be put down, depending upon the convenience and cost of timber, and filled with earth for from 8 to $1200 a mile, which is but little above the average cost of shaping or throwing up a road of earth alone, 20 feet wide. Bear in mind, too, that 15 feet is wide enough for this plan, whilst, to M'Adamize, it must be, for a double track, from 30 to 40, which forms a heavy item of the expense, and the delay in M'Adamizing should not be forgotten, for the earth must settle before the stone is put on it.

I wish you to give this an insertion in

the Railroad Journal, with such remarks as you may think proper. I ask, however, to reply to any objections that may be started. We know, from experience, that the timbers will not *wear* out, and that they *must last* as long as in *railroads*. The design is for common waggons and carriages.

There is no doubt but it will be immediately tried upon a turnpike, connecting the James River at this place with Staunton in the Valley, a distance of 44 miles, instead of M'Adamizing. I have found in the last two weeks, in a journey to Washington City and Baltimore, that, without an exception, and amongst the number several of the most intelligent and practical men found there, including several superintendants of graduation and construction of the Baltimore and Ohio Railroad, and Cumberland roads, being practical engineers, and not an individual but had the very best opinion of it, or feared its not being very valuable for collateral roads. I have no doubt that it will prove a great acquisition to the internal improvement of our country, and give great facility for the speedy transportation of the mails in winter.

It is thought generally that timbers will last better to have them burnt or charred, instead of taking the bark off.

Yours, most repectfully,

JOHN HARTMAN.

On Motions and Forces. [From Dr. Arnott's Elements of Physics.]

When the sails of a ship are first spread to receive the force or impulse of the wind, the vessel does not acquire her velocity at once, but slowly, as the continuing force gradually overcomes the inertia of her mass. If the sails are afterwards suddenly taken in, she does not lose her motion at once, but slowly again, as the continued resisting force of the water destroys it.

Horses must make a greater effort at first to put a carriage into motion, than to maintain the motion afterwards; and a strong effort is required to stop a moving carriage.

When a carriage hanging from springs first begins to move, the body of it appears to fall back, and a person, within, seems to be suddenly forced against the back cushion. When the carriage stops again, the body swings forward, and if the stoppage be very sudden, a careless passenger may find himself peeping through a front glass. These particulars prove the inertia, first of rest, and secondly of motion.

A man standing carelessly at the stern of a boat, when the boat begins to move, falls into the water behind; because his feet are pulled forward, while the inertia of his body keeps it where it was, and therefore behind its support. The stopping of a boat, again, illustrates the opposite inertia of motion, by the man's falling forward.

An awkward rider on horseback may be left behind, when his horse starts off suddenly; or may be thrown off on one side by the horse starting to the other. A horse at speed, stopping suddenly, often sends his cavalier over his ears—as was mortifyingly experienced by a coxcomb who chose to canter along a foot-path, to the annoyance of the company, and whose horse, on hearing the word *halt* loudly addressed to it by a waggish spectator who knew its military history, suddenly stood, and got rid of its load. The will of the beau had sinned against the law of propriety, but his body very perfectly obeyed the laws of inertia and gravity, by shooting forward in a parabolic curve to the earth.

A young man beginning to use the whip, ran his phæton against a heavy carriage on the road, and then foolishly and dishonestly excused his awkwardness, in a way which led to his father's prosecuting the coachman for furious driving. The youth and his servant both deposed that the shock of the carriage threw them over their horses' heads, and thus they lost the cause, by unwittingly proving that the faulty velocity was their own.

A man jumping from a carriage at speed is in great danger of falling, after his feet reach the ground, for his body has as much forward velocity as if he had been running with the speed of the carriage; and unless he advance his feet as in running, to support his advancing body, he must as certainly be dashed to the ground, as a runner whose feet are suddenly arrested. A man racing, who receives a signal to stop, and a man jumping from a flying vehicle, must check their motion nearly in the same way.

A person wishing to leap over a ditch or chasm first makes a run, that the motion thereby acquired may help him over. A standing leap falls much short of a running one.

An African traveller saw himself followed by a tiger, from which he could not escape by running; but perceiving that the animal was watching an opportunity to seize him by the usual spring or leap, he artfully led it to where the plain terminated in a precipice hidden by brush-wood, and he had just time to transfer his hat and cloak to a bush, and

to retreat a few paces, when the tiger sprung upon the bush, and, by the motal inertia of its body, was carried over the precipice, and destroyed.

From a glass of water suddenly pushed forward on a table, the water is spilt or left behind; but if the glass be already in motion, as when carried by a person walking, and if it then be suddenly stopped by coming against an impediment, the water is thrown or spilt forward.

A servant carrying a tray of glasses or china in the dark, and coming suddenly against an obstacle, hears all his freight slipping forward and crashing at his feet: and a too hurried departure with such a load causes equal destruction, on the opposite side.

The actions of beating a coat or carpet with a cane, to expel the dust; of shaking the snow from one's shoes, by kicking against the door-post; of cleaning a dusty book by knocking it against a table, or shutting it violently—all illustrate the same principle.

If a guinea be laid on a card which already rests on the point of the finger, a smart fillip or blow to the edge of the card will cause it to dart off, but the guinea, by its inertia, will remain resting on the finger—its inertia being greater than the friction on it of the card passing from underneath it.

When we desire a person, with suspected disease of the brain, to shake his head, and tell whether and where he feels pain, we are doing nearly as if we touched the naked brain with the finger to find the tender part; for the inertia of the brain, when the skull is moved, causes a momentary pressure between it and the skull, almost equivalent for our purpose to such a touch.

This kind of pressure is sufficient to break and destroy tender wares—as glass or eggs—in packages which are too suddenly moved or stopped.

A weight suspended by a spring on ship-board is seen vibrating up and down as the ship pitches with the waves. It seems to fall as the ship rises, and to rise as the ship falls: but the motion is really in the ship, and the weight is at rest. A heavy weight so supported, and connected with a pump-rod, would work the pump.

Like the weight last mentioned, the mercury of a common barometer on ship-board is seen rising and falling in the tube; and until the important improvement was lately made, of narrowing the tube in one place to prevent this, the mercurial barometer was useless at sea. The explanation is, that the tube rises and falls with the ship, from being connected with it; but the mercury, which plays freely in the tube, and is supported by the atmospheric pressure, tends, by its inertia, to remain at rest, and thus makes the motion of the ship apparent.

Similarly to the mercury in the barometer tube on ship-board, is the blood in the vessels of animals affected under similar circumstances. In a long vein below the heart, when the body falls, the blood, by its inertia and the supporting action of the vessels, does not fall so fast, and therefore really rises in the vein: and as there are valves in the veins preventing return, the circulation is thus quickened without any muscular exhaustion on the part of the individual. This helps to explain the effect of the movement of carriages, of vessels at sea, of swings, &c., and the effect on the circulation of passive exercise generally, and leaves it less a mystery why these means are often so useful in certain states of weak health.

If a cannon ball were to break to pieces in its flight, its parts would still advance with the previous velocity. Thus also, in the deadly contrivance of the Shrapnell shell, which is a case containing hundreds of musket bullets, when these are set loose at the desired distance from the devoted body of men, they retain the forward velocity of the shell, and spread death around like the near discharge of a whole battalion of musquetry.

On the awful occasion of a ship in rapid motion being suddenly arrested by a rock, all things on board, men, guns, and furniture, start from their places and dash forwards; and the inertia or motal obstinacy of the stern parts of the ship, by pressing forward, crushes the bow against the rock.

PERSEVERANCE.—Perseverance generally wins the prize, while despondence always loses it. Without perseverance, Columbus would never have gained the immortal fame of discovering a new continent.

HAPPINESS.—Happiness does not so much depend upon our circumstances, as the agreement between them and our dispositions.

GRAVITY.—Gravity belongs more to the *ass*, than the horse; it oftener conceals ignorance than indicates knowledge.

IMPRUDENCE.—Misfortune is generally but another name for imprudence.

FONDNESS.—A wife who is *fond* in the parlor, is generally *furious* in the kitchen and bed-room.

Vocal Clock.—"On Monday, April 27, 1762," says Wesley in his Journal, "being at Lurgan, in Ireland, I embraced the opportunity which I had long desired, of talking with Mr. Miller, the contriver of that statue, which was in Lurgan when I was there before. It was the figure of an old man standing in a case, with a curtain drawn before him, over against a clock, which stood on the opposite side of the room. Every time the clock struck he opened the door with one hand, drew back the curtain with the other, turned his head, as if looking round on the company, and then said with a clear, loud, articulate voice, "past one," or "two," or "three," and so on. But so many came to see this (the like of which all allowed was not to be seen in Europe), that Mr. Miller was in danger of being ruined, not having time to attend to his own business. So as none offered to purchase it, or reward him for his pains, he took the whole machine to pieces."

Architecture has a great dependence upon mechanics; yet, there are a great many precarious rules in this art, invented purely for ornament, and the sake of beauty, which have nothing to do with mechanics. And, therefore, *mechanical beauty* (that is, strength in due proportion,) is all that I have any business to meddle with here.

It has been ignorantly objected by some, that the Newtonian philosophy, like all others before it, will grow old and out of date, and be succeeded by some new system, which will then be as much cried up as this is now. But this objection is very falsely made: for never a philosopher before Newton ever took the method that he did. For whilst their systems are nothing but hypotheses, conceits, fictions, conjectures, and romances, invented at pleasure, and without any foundation in the nature of things, he, on the contrary, and by himself alone, set out upon a quite different footing; for he admits nothing but what he gains from experiments, and accurate observations; and from this foundation, whatever is further advanced, is deduced by strict mathematical reasoning. And where this thread does not carry him, he stops, and proceeds no further; not pretending to be wise above what is written in nature; being rather content with a little true knowledge, than, by assuming to know every thing, run the hazard of error. Contrary to all this, these scheming philosophers, being men of strong imaginations and weak judgments, will run on, ad infinitum, and build one fiction upon another, till their Babel, thus erected, proves to be nothing but a heap of endless confusion and contradiction; and then it is no wonder if the whole airy fabric tumbles down, and sinks into ruin. And yet it seems such romantic systems of philosophy will please some people as well as the strictest truth, or most regular system, as if philosophy, like religion, was to depend on the fashion of the country, or on the fancies and caprice of weak people. But, surely, this is nothing but rambling in the dark, and saying that the nature of things depends upon no steady principles at all. But, in truth, the business of true philosophy is to derive the nature of things from causes truly existent; and to inquire after those laws on which the Creator choosed to found the world; not those by which he might have done the same, had he so pleased. It is reasonable to suppose, that, from several causes, something differing from each other, the same effect may arise; but the true cause will always be that from which it truly and actually does arise: the others have no place in true philosophy. And this can be known no way, but by observations and experiments. Hence, it evidently follows, that the Newtonian philosophy, being thus built upon this solid foundation, must stand firm and unshaken; and being once proved to be true, it must eternally remain true, until the utter subversion of all the laws of nature. It is, therefore, a mere joke to talk of a new philosophy. The foundation is now firmly laid: the Newtonian philosophy may, indeed, be improved, and further advanced; but it can never be overthrown, notwithstanding the efforts of all the Bernouilli's, the Leibnitz's, the Green's, the Berkley's, the Hutchinson's, &c. And even the French, themselves, have at last adopted it, and given up the Cartesian scheme.—[Emerson.]

Advertisements.—We are sometimes astonished at the impudent assertions of quacks in their public announcements at the present day. Their predecessors, however, went somewhat further, as the two following advertisements taken from the original edition of the Spectator will show: "An admirable confect, which assuredly cures stuttering and stammering in children or grown persons, though never so bad, causing them to speak distinct and free without any trouble or difficulty; it remedies all manner of impediments in the speech, or disorders of the voice of any kind, proceeding from what

cause soever, rendering those persons capable of speaking easily and free, and with a clear voice, who before were not able to utter a sentence without hesitation. Its stupendous effects in so quickly and infallibly curing stuttering and stammering, and all disorders of the voice and difficulty in delivery of the speech, are really wonderful. Price 2*s.* 6*d.* a pot, with directions. Sold only at Mr. Osborn's Toy-shop, at the Rose and Crown, under St. Dunstan's church, Fleet street."

"Loss of memory, or forgetfulness, certainly cured, by a grateful electuary, peculiarly adapted for that end; it strikes at the primary source, which few apprehend, of forgetfulness, makes the head clear and easy, the spirits free, active, and undisturbed; corroborates and revives all the noble faculties of the soul, such as thought, judgment, apprehension, reason, and memory, which last in particular it so strengthens as to render that faculty exceeding quick, and good beyond imagination; thereby enabling those whose memory was before almost totally lost, to remember the minutest circumstance of their affairs, &c. to a wonder. Price 2*s.* 6*d.* a pot. Sold only at Mr. Payne's, at the Angel and Crown, in St. Paul's Church-yard, with directions."

Lord Brougham.—When his Lordship was little more than sixteen years of age he exhibited one of the most remarkable instances of precocious intellect ever recorded, by the composition of a paper containing a series of experiments and observations on the inflection, reflection, and colors of light; this paper he transmitted through the hands of Sir Pharlez Blagden to the Royal Society, in whose transactions it was printed; and in the following year a paper containing further experiments and observations on the same subject was communicated by him to the Society, and printed in their Transactions; where, in 1798, appeared from his pen, "General Theorems, chiefly porisms in the higher geometry." These papers excited considerable interest in the scientific world. An article by Professor Prevost, of Geneva, containing remarks on the optical papers, appeared in the Philosophical Transactions for 1798: and Mr. Brougham is said, at this early period of his life, to have carried on a Latin correspondence on scientific subjects with some of the most distinguished philosophers of the continent. The *Athenæum* casts a doubt on this statement; but we can vouch for its being quite correct. The three papers alluded to are all to be found in the printed Transactions of the Royal Society; and were all published before 1798, at which time Lord Brougham had not, we believe, completed his 18th year. What makes the fact the more remarkable is, that it is only the best communications to the Society—the best, at least, in the estimation of the council—which are selected for publication.

Cuvier.—It has been justly deemed one of the greatest advances in science, that the naturalist can now, on the discovery of a fossil tooth, merely by the examination of that seemingly unimportant relic, pronounce with certainty on the nature of the animal to which it belonged, the distinguishing features of its structure, and even the prominent characteristics of its nature and habits. That this has been done, and that too with animals which, like the mammoth and the mastodon, have long disappeared from the face of the earth—that we have been enabled to form in part a natural history of the world before the creation of man—we owe chiefly to Cuvier. The discovery of a few bones, which to our ancestors would merely have seemed testimonies of the reality of the existence of giants in the "good old days of Palmerin of Engiand," and "Amadis of Gaul," has led in our times to an extension of the authentic history of nature, which we could hardly blame those who lived fifty or sixty years ago for regarding as wholly impossible.—[From an excellent Memoir of Cuvier in the Literary Guardian.]

Advantage of a Little Knowledge.—The mysteries of magnetism should be unfolded to the sailor, above all men, since he is the one of all others whose safety depends on its phenomena. He should be told that on electro-magnetic principles he would materially influence the march of the needle by wiping the glass which screens it—especially with silk. It is some years ago since a fact was communicated to me, which may be adduced in illustration: it was that of a ship which arrived at Liverpool, after having been for several weeks the sport of winds and waves; the mariner's compass having been washed overboard in a storm, their voyage was dreary and procrastinated—much caution being necessary; and despite of which, their fate, but for a fortuitous circumstance, might have been inevitably sealed. Now, had the simple fact of the extreme ease with which a mariner's needle might be made,

been known to any on board, the peril might have been avoided. A sewing needle, or the blade of a penknife, being held in an upright posture, and struck by a hammer, and subsequently floated by cork on water, or suspended by a thread without torsion, would become a magnetic needle, and point north and south; or the end of a poker held vertically, and passed over its surface from one extreme to the other, would impart magnetism, and which, if the needle be of steel, would be of a permanent character.—[Mr. John Murray.]

Reading, Writing, and Speaking.—Habits of literary conversation, and, still more, habits of ex-tempore discussion in a popular assembly, are peculiarly useful in giving us a ready and practical command of our knowledge. There is much good sense in the following aphorism of Bacon: "Reading makes a full man, writing a correct man, and speaking a ready man."—[D. Stewart.]

On the Protection of Timber when used in Railways. By J. L. Sullivan. To the Editor of the American Railroad Journal.

Sir,—The objections of "Mercator" to a method I suggested of protecting timber when used in railways are obviated by merely giving the true explanation of the accidents he adduces in doubt of its efficacy. If he should suggest a better method, and will advocate it under his proper signature, it will certainly be very acceptable.

The explanation of the decay of the sleepers of the "Arcade," in seven years instead of forty, is that they were not only in an *unventilated* place, but in contact with green mortar of *common lime*. Now, as my suggestion was not the use of common lime alone, no more need to be said: but this would not be sufficiently satisfactory to one so indiscriminating. The use of lime in making mortar always supposes the progressive process of re-crystalization, which takes a long time—(in ancient Rome, mortar was not used until two years old,)—and *during this process it attracts moisture from the atmosphere:* and, of course, would impart moisture to any dryer substance in contact with it, so that it must be bad building to surround the end of a sleeper with it.

Common lime was proposed in my specification to be used only in combination with a resinous substance, pitch, or tar, for the purpose of forming a hard adhesive defence. Nor was it theory alone, but practice in other arts, that suggested it in this. It is not indeed usual, but I have known this mixture used between the sheathing and bottom of vessels, where it makes at first a very soft, but afterwards a very hard coat, when the lime, taking up the water in the tar, becomes re-crystalized. Hence I supposed it would have the same properties in any other situation. It is thus from analogy and principle that improvements are always suggested *before trial;* indeed, there is no time for *trial* of things that *time alone* can try. The *test* has been in the experience of analogous circumstances.

The method also proposed the use of hydraulic lime and fragments of stone to form a defence of the post at and near the surface of the ground, or a little below and above it. Now, it is well known that *this lime re-crystalizes quickly—that is, it sets* in about a fortnight. But if it were, as "Mercator" suggests, rolled up in a ball and placed in a plate of water, it is probable it would, while green, absorb among its particles some water. In building walls of locks, the water is not let in till the mortar has had time to set. Why, then, should it not set among fragments around a post?

He says that Roman cement and pitch will absorb water by "capillary attraction." This is rather absurd, and actually contrary to experience. We line cisterns with Roman cement; and pitch would be of no use on the bottom of vessels, if it *transmitted* water. These effects cannot take place in this way, because neither of them are of fibrous texture.

How then shall we account for the short duration of pitch on the bottoms of vessels? It will not adhere to them at all, unless the surface be dry. It may not be perfectly so, unless the vessel is a new one; and in time the planks become water-soaked or damp from the inside, and the pitch may thus be gradually dislodged by the interposition of wetness; or, it may be supposed to be *worn off by the friction* of the water the vessel glides through, while the pitch on her upper works remains firm.

Let us then suppose a railway resting on posts deep enough set not to be hove by frost, and the top first covered with a water-proof cement and capped with the rail-bearer, and defended at the surface of the ground in the above mentioned manner, or, perhaps still better, by the use of the *mineral fusible cement,* can it be doubted that the posts would not last longer than if this precaution were not taken? —Do we not thus prevent one of the causes

that must combine to hasten decay in that part?

It is true, the post will, in the ground, be in a damp situation, but its *lower part is cooler* than at the surface; and any natural wetness in the timber either evaporates above, or settles down to the bottom of it. If, by a good choice of wood, and a little care, we make the posts last three or four times as long as otherwise, it is no small advantage. Cedar or locust are expensive and not always at command; and even these will, with precaution, retain size and strength.

The use of posts as a support was also intended to allow the *bearing timbers to be raised* so much from the ground that the air would circulate freely under them, and the water run off,—for the common practice of laying these timbers on embedded cross-sleepers *brings them in contact* with the ground, and hastens decay, besides other disadvantages of this mode of foundation, liable to arise from unequal resistance in a bed of earth soft in the spring of the year.

Perhaps it was for these and like considerations, that Maj. Douglass recommended, in his report and estimate for the Jamaica Railway, the use of *posts*. He did not, indeed, suggest precautions at the surface, because, perhaps, as locust abounds or cedar can be had cheap, it was not thought necessary. It is likely that when this kind of timber is used, and a pile-driver employed to set them in two rows, this will be deemed better practice than cross-sleepers.

Your correspondent asks for practical results: he may have yet to learn that improvements, of much more pretensions than this, often wait a long time for the public attention and favor, till those who are most interested feel the want and seek the remedy.

If it be true that, in this country, where timber is cheap and iron dear, (the very reverse of the case in England,) we must in some situations have timber railways, then, to make them durable, and to *avoid the causes of premature decay*, especially, will be for the interest of stockholders and the public.

J. L. Sullivan.

Bobbin-net Trade.—A very valuable sheet of "Facts and Calculations illustrative of the present state of the Bobbin-net Trade," has just been published by a Mr. Felkin, of Nottingham. The results which it presents are exceedingly curious and instructive. The capital employed in the trade is estimated to amount to £2,310,000; the number of persons—men, women, and children—to whom it gives employment, at 211,000. The quantity of raw cotton consumed in the trade annually is 1,600,000 lbs.—value, £120,000; this cotton is manufactured into yarn, and its value increased to £500,000; the yarn is then worked into 6,750,000 square yards of power-net, 15,750,000 square yards of hand-net, and 150,000 square yards of fancy net, worth altogether £1,826,245. Of raw silk there is also used about 250,000 lbs.—value £30,000; which, when thrown and worked into 750 square yards of silk net, becomes worth £65,625. The total quantity of cotton and silk bobbin-net, annually manufactured, is 23,400,000 square yards—value, £1,891,870. Of this, about one half is exported in a plain state; three eighths are sold unembroidered at home; and the remaining one-eighth is embroidered in this country, which increases the ultimate value to £3,417,700. The total number of machines employed is stated to be 4500; of machine owners, 1382. Of these machines, 1000 are worked by power; and of the owners, above 1000 work in their own machines. The total distribution of these machines is stated to be as follows: In Nottingham there are 1240; Old Radford, and Bloomsgrove, 240; New-Basford, 95; Beeston and Chilwell, 130; Gedling, 10; Carlton, 10; Long Eaton, 10; Sandiacre, 10; Ilkestone, 45; Eastwood, 10; Loughborough, 385; Woodhouse, 30; Leicester, 95; Mansfield, 85; Sheffield, 10; Wimeswould, 25; Ruddington, 15; Tiverton, 220; Tewksbury, 50; Taunton, 35; Warwick, 5; New-Radford, 140; Lenton and Middleton Place, 70; Iron Green, 160; Old Basford and Bulwell, 55; New and Old Snenton, 180; Carrington, 50; Arnold, 30; Stapleford, 25; Stanton by Dale, 5; Heanor and Loscoe, 45; Derby, 185; Quorndon and Montsorrel, 35; Sheepshead, 15; Donington and Kegworth, 15; Chesterfield, 40; Newark, 10; Costock and Leake, 20; Melton Mowbray, 20; Barnstable, 180; Chard, 190; Isle of Wight, 80; other places, 195. Total, 4500.

Prosperous as this manufacture is in its general results—a prosperity the more remarkable, that twenty years ago there were not a dozen bobbin-net machines in the whole country—we regret to find that it has been attended in its progress with a good deal of individual distress:

"It is a lamentable fact that one-half or more of the 1100 persons specified in the list as owning one, two, and three machines,

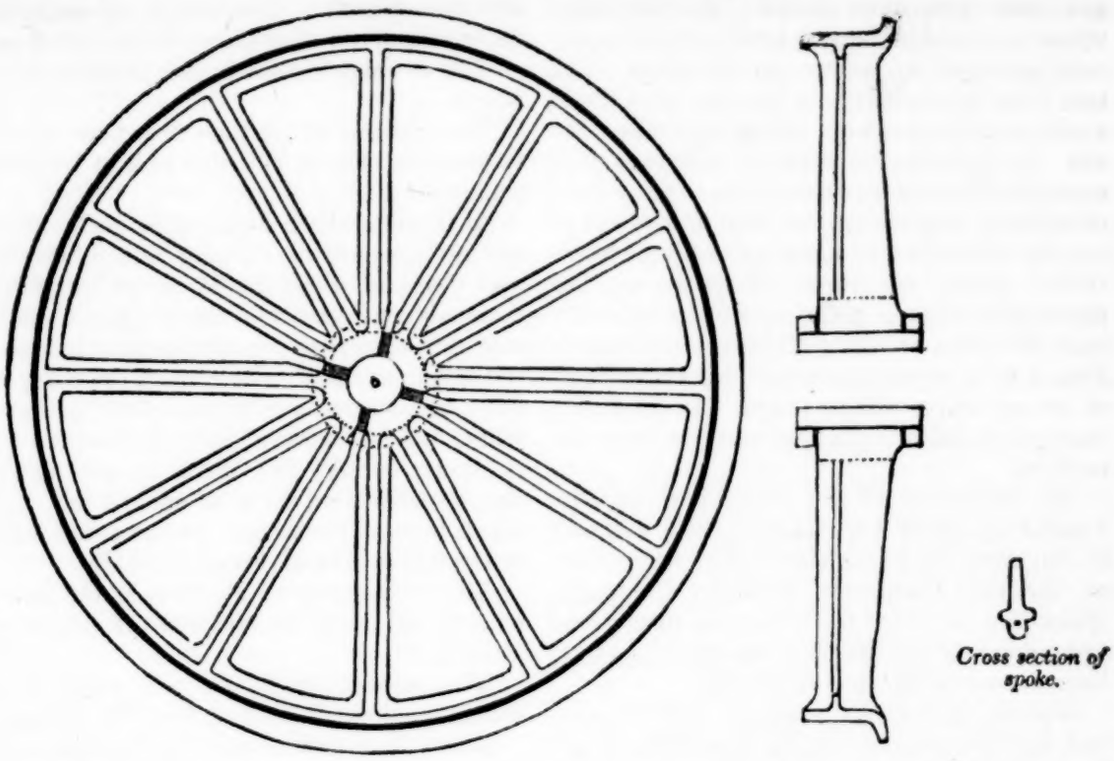
have been compelled to mortgage their machines for more than they are worth in the market, and are in many cases totally insolvent. This has chiefly arisen from the fall in prices of nets, beyond the reduction in prices of cotton and wages. This class of persons having become indebted to the cotton merchant, have been compelled to pay a comparatively excessive price for the thread they have used, and to sell their goods at the lowest price of the market. Besides, their machines are principally narrow, and make short pieces, while the absurd system of bleaching at so much a piece, goods of all lengths and widths, and dressing it for so much, all widths, has caused the new machines to be ell-wide, and capable of producing long pieces, and, of course, to the serious disadvantage, if not utter ruin of the small owner of narrow machines."

The bobbin-net which is exported in a plain state is embroidered chiefly in Belgium, Saxony, and, until recent events, in ill-fated Poland. Mr. F. thinks that but for the high rate of wages in this country, much of the work which thus falls into the hands of foreign embroiderers would be executed at home; and yet, one would think that the wages of the English embroiderer could hardly fall lower than they have already done. Mr. F. states, that he had under his eye, while writing his "Facts," some "splendid specimens of silk bobbin-net shawls, embroidered with the greatest care and beauty by young women who had worked upon them six weeks, for six days in the week, and fourteen hours a day, and had earned but *one shilling a day* by such unremitted and anxious labor." That cheaper bread and freer markets would better this as well as every other manufacture of the country, we by no means, however, intend to dispute; and we fully concur in the view which Mr. F. takes of the beneficial tendency of the two great measures of reform, alluded to in the following concluding remarks:

"If one million and a half sterling, or nearly, be paid abroad for the embroidery of bobbin-net, because the rate of wages is lower there than in this country, and if our rate cannot and ought not to be reduced, while provisions are at the actual average—if, also, there be any just ground to fear the successful competition of foreign low-priced bobbin-net laces, even in the home market,—have we not a powerful argument for the abolition of the tax on imported corn? It may also be reasonably inquired why an article, the demand for which has extended itself with a rapidity unexampled in the history of manufactures over the continents of Europe and America, should still be almost unknown eastward of the Cape of Good Hope, where it would be thought at least equally useful and ornamental?* The fact of the East India Company's monopoly, it is presumed, may be advanced as a sufficient, though, to the trade of Nottingham, a very unsatisfactory reply. For I would here observe, that as no one can say bobbin-net may not, in the event of this monopoly ceasing to stand in the way of its free export and sale, be generally adopted in India and China, so it is a matter of easy demonstration, that if only every woman at the head of a family in India (say nothing of China) were to use but one square of bobbin-net a year, the whole of the existing machinery of the trade, full handed and worked eighteen hours a day, would scarcely produce a supply sufficient for that market. Worked at that rate, our production would be under thirty millions of yards a year, and there are upwards of twenty-seven millions of mothers of families in our Indian possessions. Were it now to become in demand for China (and it is quite as likely to be so as tea once was for England), the quantity exported thither might possibly be immense, the population of China being three times that of India. The writer of these remarks feels that the evils contemplated as likely to result from increase of machinery, and consequent over-production, are too serious not to demand a careful and candid consideration, and is confident all will be convinced on reflection, that rather than attempt to decry the increase of the power of production, it is far more rational, and will ultimately be more successful, to draw the attention of the trade to any practicable means of increasing the demand."

* "We can export a durable and elegant article in cotton bobbin-net at 4d. a square yard, proper for certain useful or ornamental purposes, as curtains, &c.; and another article, used for any purpose in female dress, at 6d. the square yard."

It is reported of Alexander that he allowed eight hundred talents a year to Aristotle, to defray the expenses of procuring all sorts of living creatures; so that, by his own particular experience, he might be enabled to write of the nature and properties of them. And the reason why the world hath now so few Aristotles, is, because there are no Alexanders.—[Emerson.]



Cross section of spoke.

Improved Wheel for Railroad Waggons. By J. B. JERVIS. To the Editor of the American Railroad Journal.

UTICA, July 2, 1833.

SIR,—The annexed drawing is a copy of the plan of a railroad waggon wheel, which I made last year for the Saratoga and Schenectady Railroad Company. The several views given in the drawing will sufficiently explain the plan.

The great importance of obtaining the most perfect plan of a cast iron wheel for railroad waggons will, I presume, render any apology for introducing this subject to your notice unnecessary.

Lightness, a good chill for hardening the face of the rim and flange, with adequate strength, all judiciously combined, constitute the important requisites of a good wheel. The broad form required for the track of the rim renders it impracticable to give the metal the best form for strength to resist pressure in the direction to which it is exposed; and the lateral strain to which the wheel is exposed requires the spokes to be made very broad in proportion to the quantity of metal they contain, which is unfavorable for strength to resist the vertical strain. The plan generally adopted has been to rely on giving thickness to these parts.

The economy of cast iron wheels, over all that have been sufficiently tested, renders it important to obtain the greatest practicable perfection in their construction. In the plan I first made for the Mohawk and Hudson Railroad Company, the rim and spokes were made on the plan annexed, with the exception of the feather, and a trifling variation in the flange. The wheels carried each from three-fourths to seven-eighths of a ton, and were run at a speed of from ten to twenty miles per hour. At high speed they occasionally failed, but proved to be a safe wheel at ten miles per hour. They were run at an average speed of fourteen miles per hour, which in the course of one year broke about 25 per cent. of the stock. I mention this to show the comparative superiority of the new plan in point of strength, while the only essential variation is in the feather on the spokes, and on the underside of the rim. This addition, so important to the strength, has increased the weight of the wheel from 255 lbs. to 275 lbs., making only 20 lbs. difference. This plan has been adopted for all the wheels on the Saratoga Railroad, and all the wheels subsequently obtained for the Mohawk and Hudson Railroad have been on the same plan. A few have recently been procured on the Mohawk and Hudson, which are a modification of this plan, and which experience may prove advantageous. They have been nearly a year in use on both roads, and not a single wheel in the passen-

ger carriages have failed. An imperfect wheel in a tender waggon broke, which is the only instance of failure on this plan. The test they have undergone has proved, I think, satisfactorily, that they are a safe wheel for the load before mentioned, moving at a speed of fifteen miles per hour. They have often been run under that load at a speed of twenty miles, and in some instances at twenty-five miles per hour. Experience has shown that when a speed of fifteen miles per hour is taken as the general rate of travelling, it will frequently happen that a velocity of twenty miles will be made. In providing strength it is therefore necessary to keep this in view.

The diameter of the wheel is three feet. I made a plan of a wheel two and a half feet in diameter, in which the feather was adopted for the Rochester Railroad Company. They have had the wheels in use nearly one year, and, though the plan was quite light, no instance of failure has occurred.

Should further experience confirm what has thus far proved highly favorable, it will hardly be necessary to resort to the more expensive plans of wood and wrought iron for wheels, when an average speed of fifteen miles per hour will be adequate to the demands of the business to be done; and which may be taken in general as a fair business calculation.

On a railroad judiciously located and constructed, a locomotive steam engine may move at this speed with ease, safety, and economy. With proper attention, it will be easily kept in order for regular work.

Respectfully, your obedient servant,

JOHN B. JERVIS.

P. S.—The new Locomotive for the Saratoga and Schenectady road is at work, and in a few days you may expect from me some account, according to promise. In the mean time, I hope you will not publish any of the irresponsible notices that may be made of it.

STATISTICS OF PARIS.—From the paper of Count Chabrol, Paris contains 65 public and 124 enclosed fountains. If the city were six times larger than it is, the canal of L'Ourcq would furnish a supply.

The boats carrying goods upon the Seine are supposed to be 1500 in number.

The highest streets are D'Enfer and De l'Estrapade.

The greatest mortality prevails in March and April, the least in July and August.

The greatest number of births is in January and March. The births of males are more numerous than those of the other sex.

The average deaths in hospitals is one in seven.

The number of persons drowned annually varies from 270 to 310, and half of these are suicides.

All burials are conducted by undertakers, and the expense of burying one of the lowest class of inhabitants is about $7,75. Scarcely one fourth of the population is buried at the expense of their families or friends.

On an average every man, woman, and child, consumes per annum 125 bottles of wine! and 14 bottles of brandy! besides what is drank outside the walls in the tippling shops established there to escape the octroi. Each person consumes on the same calculation $11 worth of bread annually.

The commerce of Paris is immense. It exports of itself 50,000,000 of francs per annum.

The annual profit on the watches and clocks made in Paris is 3,500,000 francs.

Forty thousand horses are brought to and sold every year in Paris. The average value of each horse is $35.

The annual consumption of paper is 356,000 reams.

The taxes are heavy. Mr. Cooper, the novelist, undertook, at the instance of La Fayette, to vindicate the cheapness of republican institutions. He found in Paris sufficient for his purposes by way of contrast. The indirect taxes are about four millions and a half per annum. Every person in Paris pays at least about $22,50 per annum, in the shape of taxes.

The travel to and from Paris is immense. Twenty thousand people go and come every week by the diligences and malleposte.

We could add many more interesting facts about this great depot of the world.

STEAMBOAT SAFETY APPARATUS.—Experiments are in progress at the Franklin Institute, Philadelphia, for testing the tenacity of iron. They were instituted by a resolution of Congress, and are made under the direction of the Secretary of the Treasury. Mr. Johnson superintends them. The immediate object of the experiments was the increase of safety and certainty in the construction of steam boilers, the frequent bursting of which on the western waters had occasioned so many disasters. The Pennsylvanian gives some of the results: the machinery with which they were made is said

to be better than any ever tried in Europe, and it is so contrived as to be used at any temperature of the metals, from 0 to 500 degrees of Fahrenheit.

It was found that, up to 450 degrees, the tenacity of good iron increases in a direct ratio with the heat applied. This is contrary to the popular opinion. One bar of Tennessee iron, manufactured at the Cumberland Iron Works, below Nashville, was submitted to both cold and hot processes, and showed, as the temperature varied, a tenacity ranging from 59,000 to 64,000 pounds the square inch. The best Pennsylvania and Tennessee iron exhibited nearly the same qualities. Connecticut iron is also remarkable for tenacity; that of New-York had not been tried.

The Pennsylvanian adds one remarkable general result, which we quote as a matter of public congratulation. It is this: "The most ordinary American iron is equal to the best British—and the best American is equal and frequently superior to the best Swedish and Russian that can be imported." A report of all these experiments and results is to be made to the Secretary of the Treasury, and laid before Congress.—[Balt. Amer.]

STEREOTYPING FIRST INVENTED IN AMERICA.—In the last number of the "American Journal of Science" we find an original paper of the late Lieut. Governor Colden, describing the process of stereotyping, addressed to Dr. Franklin, and the Doctor's reply thereto, dated in 1743, which is long before the invention was brought into practical operation in Europe. It will be perused with interest, as it proves that to this country belongs the merit of the first introduction of this useful art. We extract the following:

"Ever since I had the pleasure of a conversation with you, though very short, by our accidental meeting on the road, I have been very desirous to engage you in a correspondence. You was pleased to take some notice of a method of printing which I mentioned to you, at that time, and to think it practicable. I have no further concern for it than as it may be useful to the public; my reasons for thinking so you will find in the enclosed copy of a paper which I last year sent to Mr. Collinson, in London. Perhaps my fondness for my own conceptions may make me think more of it than it deserves, and may make me jealous that the common printers are willing to discourage, out of private interest, any discovery of this sort. But as you have given me reason to think you zealous in promoting every useful attempt, you will be able absolutely to determine my opinion of it. I long very much to hear what you have done in your scheme of erecting a society at Philadelphia, for promoting useful arts and sciences in America. If you think of any thing in my power whereby I can promote so useful an undertaking, I will with much pleasure receive your instructions for that end. As my son Cadwallader bears this, I thereby think myself secured of the pleasure of a line from you by him."

PHILADELPHIA, Nov. 4, 1743.

SIR,—I received the favor of yours, with the proposal for a new method of printing which I am much pleased with; and since you express some confidence in my opinion, I shall consider it very attentively and particularly, and, in a post or two, send you some observations on every article.

My long absence from home in the summer put my business so much behind hand, that I have been in a continual hurry ever since my return, and had no leisure to forward the scheme of the society. But that hurry being now near over, I propose to proceed in the affair very soon, your approbation being no small encouragement to me.

I cannot but be fond of engaging in a correspondence so advantageous to me as yours must be. I shall always receive your favors as such, and with great pleasure.

I wish I could, by any means, have made your son's longer stay here as agreeable to him as it would have been to those who began to be acquainted with him.

I am, Sir, with much respect,
Your most humble servant,
B. FRANKLIN.

Dr. Colden.

The mode of printing above described is now known by the term *Stereotype;* and it is a curious fact that the stereotype process, said to have been invented by M. Herhan, in Paris, and now practiced by him in that city, under letters patent of Napoleon, is precisely the same as that spoken of by Dr. Colden more than sixty years ago.

It is more than probable that when Dr. Franklin went to France, he communicated Dr. Colden's "new method of printing" to some artizan there, and that it lay dormant till about sixteen years since, when Herhan, a German, who had been an assistant to M. Didot, the printer and type-founder of Paris,

but then separated from him, took it up in opposition to M. Didot. We have conversed with gentlemen who have seen M. Herhan's method of stereotyping, and they describe it to be exactly what Governor Colden invented. This fact established, there can be no doubt that M. Herhan is indebted to America for the celebrity he has obtained in France.

Since the above papers fell into our hands, we have endeavored to obtain information respecting the different modes of stereotyping now in use. The following is the result of our inquiries:

By a book published in Paris, about ten years since, by M. Camus, of the French National Institute, we find that a Bible was printed in Strasburgh, by one Gillet, more than a hundred years ago, with plates similar to those now used by Didot and Herhan, but not by any means so perfect. Gillet's moulds were made of a fine clay and a particular kind of sand found only in the neighborhood of Paris. It is also stated that a number of other ingenious men had at various times produced plates tolerably perfect, by different processes, but we may safely infer, from the art having made no great progress until the time of Didot the elder, that their endeavors had not been crowned with much success.

At the beginning of the French Revolution, great quantities of paper money becoming necessary to supply the deficiency of specie, either concealed or sent out of the kingdom by the rich, Didot was applied to by the National Assembly to invent some kind of *assignat* or bank bill, which should not easily be imitated; and at this period it was that M. Didot first directed his attention to the means of producing, *in relief*, a set of plates, to print on a common printing press, which were exactly *fac-similes*, and could not without much difficulty be falsified. This process was termed Polityping, as the mould in which the plates were cast was durable, and would produce any number of copies; the usual mode of stereotyping being, as the French term it, *à moulé perdu*—it being necessary to make a new mould for every plate.

But as M. Didot's views were by degrees extended to the casting of pages for book printing, he found it unnecessary to use durable moulds, and therefore, after a year's experiment, invented a composition, which, like the sand used by brass-founders, might be wrought over again for different casts. The elegant editions produced by M. Didot and Sons are the best proof of his success.

When the fame of M. Didot's invention reached England, Lord Stanhope, an ingenious and wealthy nobleman, whose time and fortune were principally devoted to the advancement of the arts, made propositions to Mr. Andrew Wilson, of Wild Court, Lincoln's Inn Fields, proprietor of the Oriental press, to assist him in such experiments as might bring to perfection a new mode of stereotyping, of which his lordship had obtained some ideas. Mr. Wilson embraced the proposal; and after four or five years of incessant labor, they attained nearly all the advantages they had contemplated. Mr. Wilson, in the year 1802, built his foundry in Duke street, Lincoln's Inn Fields, and in the following year disposed of the secret for six thousand pounds sterling, and some future advantages, to Mr. Richard Watts, for the use of the University of Cambridge. In the year following he disposed of it on similar terms to the University of Oxford.*

About two years ago a brother of Mr. Watts, of Cambridge, began a course of experiments in this city,‡ for a more cheap and easy manner of stereotyping than any hitherto discovered; and, in spite of innumerable disadvantages, has succeeded beyond his utmost expectation. We have seen plates of his casting of the greatest perfection and beauty. The chief difficulty he has experienced arose from the jealousy and illiberality of the common type-founders, who refused to lend the little aid he required of them. It is agreeable to us, however, from our own observations to be able to state that by uncommon perseverance through accumulated obstacles, Mr. Watts has invented a method of casting the common types much more perfect than those made in the usual way; and now will proceed with his plates without the assistance of other artists.

The principal defects in M. Didot and Lord Stanhope's processes, arise from the softness of the moulds they employ, which are composed of plaster of paris and some other ingredients. In taking them from the page, of which they are intended to cast a perfect copy, some part of the composition will always remain in the type, and leave the mould imperfect. After the plates are cast

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* The two Universities of England have the exclusive right of printing Bibles and Prayer Books. Twenty or thirty presses are generally employed in that business alone; the classic departments require many others.

‡ New-Haven, Conn.

there is consequently much work for an engraver, to make them fit for use. Mr. Watts' mould being of solid materials, no such inconvenience can arise.

The steam engine and spinning jenny will do more for our national prosperity than all our statesmen and generals.

THE CAPABILITIES OF MACHINERY IN THE INCREASE OF MANUFACTURES.—In our remarks last week on open trade with *one hundred millions in India, and three hundred and fifty millions in China*, we observed that our manufactures were capable of being increased to any extent: that extent is certainly not *infinite*—it is however *indefinite*,—and to an indefinite extent our manufactures might be multiplied by machinery. In the single but important article of cotton, one man can now produce two hundred times more goods in a week than he could in 1760, when George the Third ascended the throne. One mill in Manchester can, when all the spindles are at work, spin as much cotton thread in a week as would go round the world. In the manufacture of hosiery, which is seated chiefly in the midland counties of Nottingham, Derby, and Leicester, machinery has reduced stockings one hundred per cent. compared with what they were twenty years ago. Owing to machinery, lace, which was 2s. per yard eight years ago, may now be bought for 4d.; what was £4 10s. per yard twenty years ago, is now 18d.; and some kinds may be bought as low as one farthing per yard! Woollens have experienced less reduction in price than any other kind of wearing apparel. At a paper manufactory in Hertfordshire, a quantity of pulp can, at a distance of 27 feet from the cistern in which it lays, be converted in three minutes, by machinery, into a sheet of paper ready to be written upon! Such is the continual advancement made in the Manchester manufactures by machinery, that the trade say, if the manufacturer were to leave manufacturing for a few years, he would be quite lost upon returning into it again. Railroads are machinery, and their adoption and extension will tell upon the price of manufactured goods. Although the improvements in machinery during the last thirty years have been so wonderful, as to unite the realities of truth with more than the wonders of fiction, yet who will be so bold as to say that we are at the very top of the hill of advancement in mechanism? It was stated in evidence before a parliamentary committee, at the conclusion of the late calamitous and ruinous war, to the astonishment of the committee, that during the war machinery equal to the power of sixteen millions of men had been set to work in this country! and if a market could be found for what machinery is able to produce, that could soon be doubled. Now, owing to the increase of the population, particularly of the laboring classes, and the want of markets, machinery is in bonds, and the mechanic stands with one hand tied behind him, while the starving and misguided operative is ready with both hands to demolish his valuable inventions. What we want now is to open trade to India and China; then will the green withes, wherewith the Sampson of machinery is bound, be broken asunder, and the steam engine and spinning jenny, to which England owes more than all her generals, admirals, and statesmen, will increase that debt, by securing the valuable *natural* productions of art and science.—[London paper.]

WRITTEN NEWSPAPERS.—The desire of news from the capital, on the part of the wealthier country residents, and probably the false information and the impertinence of the news-writers, led to the common establishment of a very curious trade,—that o. a news correspondent, who, for a subscription of three or four pounds per annum, wrote a letter of news every post day to his subscriber in the country. This profession probably existed in the reign of James I.; for in Ben Jonson's play, "The Staple of News," written in the first year of Charles I., we have a very curious and amusing description of an office of news manufactures:

> "This is the outer room, where my clerks sit,
> And keep their sides, the Register i' the midst;
> The Examiner, he sits private there within;
> And here I have my several rolls and files
> Of news by the alphabet, and all put up
> Under their heads."

The news thus communicated appears to have fallen into as much disrepute as the public news. In the advertisement announcing the first number of the "Evening Post," (Sept. 16th, 1709,) it is said, "There must be three or four pounds per annum paid by those gentlemen who are out of town, for written news, which is so far, generally, from having any probability of matter of fact in it, that it is frequently stuffed up with a *We hear*, &c.; or, *an eminent Jew merchant has received a letter*, &c.; being nothing more than downright fiction." The same advertisement, speaking of the published papers, says,

"We read more of our own affairs in the Dutch papers than in any of our own." The trade of a news correspondent seems to have suggested a sort of union of written news and published news; for towards the end of the seventeenth century, we have *news letters* printed in type to imitate writing. The most famous of these was that commenced by Ichabod Dawks, in 1696, the first number of which was thus announced: "This letter will be done upon good writing paper, and blank space left, that any gentleman may write his own private business. It does undoubtedly exceed the best of the *written news*, contains double the quantity, is read with abundance more ease than pleasure, and will be useful to improve the younger sort in writing a curious hand."—[Companion to the Newspaper, England.]

History of Astronomy.—No science in the world is of more value, or of higher antiquity, than Astronomy. Its antiquity may be learned from what was spoken by God himself at the creation of the world; for He said—"Let the sun and the moon be for signs and for seasons," &c.

By this it is thought the human race never existed without some knowledge of Astronomy among them. It is said by some Jewish Rabbins, that Adam was endowed with a knowledge of the nature, influence, and uses of the heavenly bodies; and Josephus ascribes to Seth and his posterity an extensive knowledge of Astronomy.

It is supposed by some writers, that Noah retired after the flood to the north-east part of Asia, where his descendants peopled the vast empire of China. "This," says Dr. Long, "may account for the Chinese having so early cultivated the study of Astronomy." But the vanity of the Chinese has prompted them to pretend to a knowledge of this science almost as early as the flood itself.

To the emperor Hoang-ti, the grandson of Noah, they attribute the discovery of the Pole star and the mariner's compass. They also say, that Confucius, their great philosopher, who lived 551 years B. C. has recorded 36 eclipses; but be this as it may, the Chinese are allowed to have had a very early knowledge of Astronomy.

Some authors say it had its origin among the Chaldeans, others among the Hindoos, and some, with more probability, among the Egyptians. Professor Playfair has given a learned and ingenious dissertation on the Astronomy of the Brahmins, in the second volume of the Transactions of the Royal Society of Edinburgh, in which he shows the great accuracy and high antiquity of the science among them; and he also shows that it is extremely probable that the Hindoos were among the first Astronomers in the world.

But Thales of Miletus is considered as the first person that propagated any truly scientific knowledge of Astronomy; and it is said he acquired his knowledge of the subject in Egypt.

Thales taught his countrymen the cause of the inequality of the days and nights; explained to them the theory of eclipses, and the manner of predicting them, and gave them an example of his art in an eclipse of the sun, which happened soon after: he was born about 640 years B. C. Anaximander was a pupil of Thales, and succeeded him as head of the school of Miletus. It is said he had some idea of the spherical shape of the earth; he is also said to have been the inventor of celestial globes, and of the orthographic projection of maps. He constructed a gnomon at Sparta, by which he ascertained the obliquity of the ecliptic, with the solstices and equinoxes.

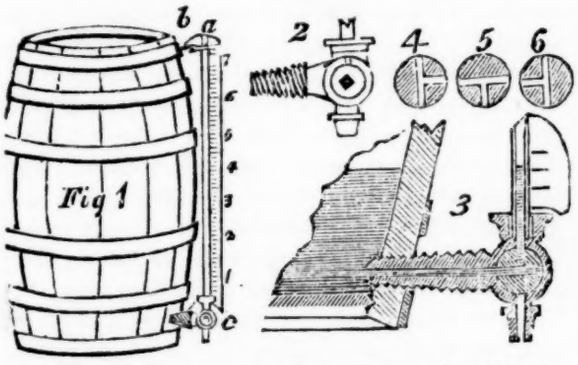
Pythagoras was the next person who improved the science. He founded a school in Italy for that very purpose. Seconded by his earliest scholars, he clearly demonstrated the spherical shape of the earth, which Anaximander had only conjectured. Pythagoras taught that the sun was fixed in the centre of the planetary orbits, and that the earth moved round it with the other planets—the very system which is taught at this day. This opinion he communicated only to his pupils in secret; for being repugnant to the received opinions of that time, (and even appearances,) he did not wish to expose himself to the derision and persecution of ignorance and fanaticism, which would have been the inevitable consequence. For about 100 years after his time, Anaxagoras was condemned to banishment for saying that the sun was a mass of fiery matter. The measuring of time being a principal object in Astronomy, many efforts were made by the ancients to determine accurately, and to compare with each other, the motions of the sun and moon, on which this measure universally depends. [*To be continued.*]

To ascertain the Quantity of Alcohol contained in Ale or Porter.—Take any measured quantity of ale, or porter, and

put it into a glass retort, connected with a close receiver; distil with a gentle heat as long as any spirit passes over into the receiver, which may be known by heating a small quantity of the fluid in a tea-spoon over a candle, from time to time. If the vapor catches fire, the distillation must be continued till the vapor ceases to burn when brought in contact with flame. The distilled liquid is the spirit of the beer combined with water; put this spirit into a tube divided into one hundred equal parts, and add pure dry subcarbonate of potash till it fall undissolved to the bottom of the tube; the spirit will thus be separated from the water and float on the top: hence the quantity of real spirit, or alcohol, per cent. may be easily determined.

Hennekey's Gauge for Standing Casks. [From the London Mechanics' Magazine.]

We extract from the last part of the "Transactions of the Society of Arts" the following more particular description of the new mode of gauging casks introduced by Mr. Hennekey, of London. The invention is of such manifest utility, that it can scarcely fail to come into universal use; and has very deservedly obtained for the inventor the honor of the Society's silver Isis Medal.



"Fig. 1 is an elevation of a cask with the gauge applied to it. Fig. 2 is the cock *c* in fig. 1, on a large scale; it has three openings, one above, one below, and one in the side; by means of the screw in the latter opening, it is fixed firmly into the cask, as shown in the section, fig. 3. An upright wooden bar is then secured to the outside of the cask, having a groove *b* in it, corresponding with, and being, as it were, a continuation of the upper pipe of the cock *c*; in this groove is placed a glass tube, open at both ends, the lower part of which drops into the upper pipe of the cock, and is fixed there by means of white lead, or any other cement not acted on by spirit or by water; the tube is also secured above by a ring or cap. Parallel with the tube is a brass plate, on which the divisions are subsequently to be marked. The plug of the cock has three ways or openings, as shown in figs. 3, 4, 5, 6. A tongue or index projects from the plug, indicating the position of one of these ways; it may be seen in fig. 2—the position of which corresponds with that of the sectional view, fig. 3.

"The apparatus being complete as above described, the cock is turned to the position fig. 3, and the cask is filled by a hole at the top. It is evident, therefore, that the liquor will stand in the tubes at the same height it does in the cask, provided the tube is wide enough to avoid any sensible error from capillary attraction: this height is marked as the *b* or zero of the scale. The plug of the cock is then turned to the position fig. 6, and a given measure is drawn off, forming the unit of the scale. In the large standing casks, the quantity that is found practically the most convenient is five gallons. The plug is then returned to its former position, and the column of liquor in the tube will now be lower than the zero; the point at which it stands is to be marked on the scale as before. Proceeding in this manner to draw off successively five gallons at a time, the whole contents of the cask are thus transferred to the scale, each division of which represents five gallons, and the scale may be numbered upwards or downwards, as may be found the most convenient. The scale should not be continued to the bottom of the tube, but should terminate at the point where the dregs are usually found to begin. It is best not to leave a column of liquid constantly in the tube, as a deposit in that case takes place on the inside, which obscures it; when, therefore, any liquor has been drawn off, the plug of the cock should be brought to the position fig. 4, and previously to drawing off a fresh quantity, the plug should be brought to the position fig. 6.

"By the adoption of this method of graduation, the liquor dealer may take stock every day in a few minutes, by merely turning the plugs to the position fig. 3, and then reading the number corresponding with the height of liquor in the glass tube attached to each cask.

"Mr. Hennekey also finds these graduated casks to save much time and give greater precision, in making different liquids to form those compounds which are required by his customers. If, for example, he wants

to mix together spirit and syrup in any given proportion, he puts the two liquors into separate casks on the ground floor, and places an empty cask, also graduated, on the platform above, and then pumps from the lower casks into the upper one the determined quantity of each ingredient; he then allows the mixture to remain for twenty-four hours, after which he reads off the quantity, and, by comparing this with the previously known quantity of the separate ingredients, ascertains how much has been lost in volume by condensation, and therefore how much additional price must be charged as an equivalent."

METHOD OF GIVING A BLACK AND GLOSSY COATING TO CAST IRON TRINKETS, AND OTHER ARTICLES OF THE SAME MATERIAL.—The desire expressed by some of our subscribers to have the receipt for the varnish employed on the cast iron trinkets of Berlin iron, so called, induced us to request a person conversant with the different processes of the arts, to ascertain the best method of making that varnish. We now give a recipe, not for the varnish itself, but for a black coating, which can be applied to any description of cast iron articles. This composition is simple, and offers the invaluable advantage of efficaciously resisting the action of the atmosphere, and even of weak acids, so that the process may be employed for coating a great variety of cast utensils, commonly used in our families. The coating easily fixes itself on cast iron, and may also be used on hammered iron, but with less certainty of success in the latter case than in the former.

Attach each of the articles to be coated to an iron wire bent above into a hook, and apply a thin coat of linseed oil; the coat must be thin, to prevent the oil from running, forming asperities or knots where it collects. Hang them eight or ten inches above a wood fire, so that they may be completely enveloped in the smoke. When they have been thus exposed to a brisk fire for about an hour, lower them so that they shall be near the burning coals, without touching them; at the expiration of about fifteen minutes, remove the articles and immediately immerse them in cold spirits of turpentine.

Any articles which, after this last operation, may be found deficient in brilliancy, or not sufficiently black, are to be re-exposed to the burning coals for a few minutes, and again dipped in spirits of turpentine.

This process, which may be variously modified to suit different articles, may, from its simplicity, be extensively applied, and will prove useful in all the cases in which cast utensils are subject to rapid oxidation.—[Journal des Connaissances Usuelles.]

The Progressive Condition of Man as contrasted with the Stationary Condition of Inferior Animals. [From Arnott's Elements of Physics.]

While the inferior races of animals seem to have changed as little in any respect since the beginning of human records, as the trees and herbs of the thickets which give many of them shelter, the condition of man himself has fluctuated, and, on the whole, progressed in a very remarkable manner. The inferior animals were formed by their Creator such, that, within one life or generation, they should attain all the perfection of which their nature was susceptible. Their wants were either immediately provided for—as instanced in the clothing of feathers to birds, and of furs to quadrupeds; or were so few and simple, that the supply was easy to very limited powers—except in a few cases where considerable art was required, as by the bee in making its honey-cell, or by the bird in constructing its beautiful nest, and there a peculiar aptitude or instinct was bestowed. Thus a crocodile, which issues from its egg in the warm sand, and never sees its parent, becomes as perfect and knowing as any crocodile that has lived before or that will appear after it. But how different from this is the story of man! He comes into the world the most helpless of living beings, long to continue so; and if deserted by parents at an early age, so that he can learn only what the experience of one life may teach him,—as to a few individuals has happened, who yet have attained maturity in woods and deserts,—he grows up in some respect inferior to the nobler brutes. Now, as regards many regions of the earth, history exhibits the early human inhabitants in states of ignorance and barbarism, not far removed from this lowest possible grade which civilized men may shudder to contemplate. But these countries, occupied formerly by straggling hordes of miserable savages, who could scarcely defend themselves against the wild beasts that shared the woods with them, and the inclemencies of the weather, and the consequences of want and fatigue, and who to each other were often more dangerous than any wild beasts, un-

ceasingly warring among themselves, and destroying each other with every species of savage, and even cannibal cruelty—countries, so occupied formerly, are now become the abodes of myriads of peaceful, civilized, and friendly men, where the desert and impenetrable forests are changed into cultivated fields, rich gardens, and magnificent cities.

It is the strong intellect of man, operating with the faculty of language as a means, which has gradually worked this wonderful change. By language fathers communicated their gathered experience and reflections to their children, and these to succeeding children with new accumulation; and when, after many generations, the precious store had grown until simple memory could retain no more, the arts of writing, and then of printing, arose, making language visible and permanent, and enlarging illimitably the repositories of knowledge. Language thus, at the present moment of the world's existence, may be said to bind the whole human race of uncounted millions into one gigantic rational being, whose memory reaches to the beginnings of written records, and retains imperishably the important events that have occurred; whose judgment, analyzing the treasures of memory, has discovered many of the sublime and unchanging laws of nature, and has built on them all the arts of life, and through them, piercing far into futurity, sees clearly many of the events that are to come; and whose eyes, and ears, and observant mind, at this moment, in every corner of the earth, are watching and recording new phenomena, for the purpose of still better comprehending the magnificence and beautiful order of creation, and of more worthily adoring its beneficent Author.

Hydrostatic Bed.—This is one of those happy inventions that have sprung from the practical application of science to the wants of life. It not only delights us by its ingenious novelty and great simplicity, but commands a still deeper interest when we consider the relief which it will afford in innumerable cases of protracted suffering, where hitherto the patient has been considered in a great measure beyond the power of the physician. In all diseases where the system has been much enfeebled, and the patient long confined to bed, the circulation of the blood goes on so imperfectly, in some of those parts of the body that are more immediately and more constantly subjected to pressure, that they frequently mortify, or lose their vitality. The part thus formed becomes a continual source of irritation, often exhausting the patient's strength by a slow decay, where otherwise every hope might have been entertained of recovery; and when he does survive, they are removed solely by the slow process of ulceration, during a tedious convalescence. The hydrostatic bed will mitigate or entirely remove these evils; and even when they appear in a milder form, still it becomes of the utmost value, from the certainty with which those sources of irritation are removed, that arise from the inequality of pressure in a common bed, and prevent that refreshing sleep which it is always such an object to procure. This bed is constructed as follows: A trough six feet long, two feet six (or nine) inches broad, and one foot deep, is filled to the depth of six or seven inches with water, and a sheet of water-proof India rubber cloth placed upon it. It is fixed and firmly cemented at the upper part of the trough, being of such size as to hang down loosely in the inside, and floating on the surface of the water, which admits, therefore, of the most perfect freedom of motion. A light hair mattress is placed upon the water-proof cloth, upon which the pillow and bed-clothes are to be placed. When the patient rests upon it, he at once experiences the surpassing softness of the hydrostatic bed: he is placed nearly in the same condition as when floating on water, the fluid support being prevented from touching him, however, by the peculiar manner in which it is sealed, hermetically, as it were, within the water-proof cloth, and by the intervening mattress. The hydrostatic bed was invented, a short time since, in London, under the following circumstances, by Doctor Arnott, the author of the Elements of Physics: A lady, who had suffered much, after a premature confinement, from a combination and succession of low fever, jaundice, &c. and whose back had sloughed (mortified) in several places, was at last so much exhausted, in consequence of the latter, that she was considered in the most imminent danger. She fainted when the wounds in her back were dressed, and was passing days and nights of uninterrupted suffering, as the pressure even of an air pillow had occasioned mortification. Dr. Arnott reflected that the support of water to a floating body is so uniformly diffused that every thousandth part of an inch of the inferior surface has, as it were, its own separate liquid pillar, and no one part bears the load of its

neighbor; that a person resting in a bath is nearly thus supported; that this patient might be laid upon the face of a bath, over which a large sheet of the water-proof India rubber cloth was previously thrown; she being rendered sufficiently buoyant by a soft mattress placed beneath her; thus would she repose on the face of the water, like a swan on its plumage, without sensible pressure any where, and almost as if the weight of her body were annihilated. The pressure of the atmosphere on our bodies is fifteen pounds per square inch of its surface, but because uniformly diffused is not felt. The pressure of a water bath, of depth to cover the body, is less than half a pound per inch, and is similarly unperceived. A bed having been made on this plan, and the patient placed on it, she was instantly relieved in a remarkable degree, and enjoyed a calm and tranquil sleep; she awoke refreshed; she passed the next night much better than usual, and on the following day, it was found that all the sores had assumed a healthy appearance: the healing from that time went on rapidly, and no new sloughs were formed. When the patient was first laid upon the bed, her mother asked her where the down pillows, which she before had used, were to be placed; to which she answered, that she knew not, for that she felt no pain to direct; in fact, that she needed them no more. The hydrostatic bed will be useful, not merely in extreme cases, such as the above, but also in every instance where there is a restlessness or want of sleep, from the irksome feeling communicated by that inequality of pressure which is necessarily perceived in every common bed, and to which the body becomes so remarkably sensible, when fatigued or enfeebled, as when suffering from disease. The sensation which is experienced by a person reclining on a hydrostatic bed is uncommonly pleasing. It is easy to change the position with a very feeble effort. The patient also can always take a little exercise at pleasure, with the slightest exertion, from the facility with which the water can be moved—a circumstance which will prove highly grateful to those who have been long confined to bed.

Caoutchouc.—Few persons are perhaps aware of the comparatively late introduction of India rubber into this country. The following notice is appended by Dr. Priestley to the preface of his "*Family Introduction to the Theory and Practice of Perspective*," printed in 1770; and it will be observed that no name is given to the substance described: "Since this work was printed off, I have seen a substance excellently adapted to the purpose of wiping from paper the marks of a black lead pencil. It must, therefore, be of singular use to those who practice drawing. It is sold by Mr. Nairne, mathematical instrument maker, opposite the Royal Exchange. He sells a cubical piece, of about half an inch, for three shillings, and he says it will last several years."—[Philosophical Magazine.]

Incombustible Wash and Stucco White Wash.—The basis for both is lime, which must be first slacked with hot water, in a small tub or piggin, and covered, to keep in the steam; it then should be passed, in a fluid form, through a fine sieve, to obtain the flour of the lime. It must be put on with a painter's brush—two coats are best for outside work.

First. To make a fluid for the roof, and other parts of wooden houses, to render them incombustible, and coating for brick tile, stone work and rough cast, to render them impervious to the water, and give them a durable and handsome appearance.—The proportions in each receipt are five gallons. Slack your lime as before directed, say six quarts, into which put one quart of clean rock salt for each gallon of water, to be entirely dissolved by boiling, and skimmed clean; then add to the five gallons one pound of alum, half a pound of copperas, three-fourths of a pound of potash—the last to be gradually added; four quarts of fine sand or hard wood ashes must also be added; any coloring matter may be mixed in such quantity as to give it the requisite shade. It will look better than paint, and be as lasting as slate. It must be put on hot. Old shingles must be first cleaned with a stiff broom, when this may be applied. It will stop the small leaks, prevent moss from growing, render them incombustible, and last many years.

Second. To make a brilliant Stucco White Wash for the Buildings, inside and out.—Take clean lumps of well burnt stone lime; slack the same as before; add one-fourth of a pound of whiting or burnt alum pulverized, one pound of loaf or other sugar, three pints of rice flour made into a very thin and well boiled paste, starch, or jelly, and one pound clean glue, dissolved in the same manner as cabinet-makers do. This may be applied cold within doors, but warm outside. It will be more brilliant than plaister of paris, and

retain its brilliancy for many years, say from fifty to one hundred. It is superior, nothing equal. The east end of the President's house in Washington is washed with it.

Dr. Franklin.—In a lecture recently delivered in Philadelphia, Mr. Rush made the following allusion to Dr. Franklin:

"Archimedes, in his glory, boasted that if he had a spot on which to place a fulcrum, he could move the earth. But, gentlemen, the earth was never moved by Archimedes. This spot existed only in imagination,—it was a fiction—but a dream, interpreting what *might* be the future power of knowledge over nature. Now let me bring you from ancient fiction to modern fact. What has made Franklin's name immortal? Why is America proud to own him as one of her noblest sons? Why stands his name enrolled upon her imperishable charter of rights, and upon her tablets of science? Why is his memory revered at home, and honored abroad? See in yonder churchyard the envied path which strangers tread, that leads to his modest tomb. What takes him there? For

> 'No sad tear upon his grave is shed,
> That *common* tribute of the *common* dead;
> But there, the *wise*, the *generous*, and the *brave*,
> With God-like envy, sigh for such a grave.'

What were his original claims to distinction? Was he clothed in the robes of riches or authority? Did the busy breath of popularity blow *him*, like some of its paper puppets, into worldly notice? No: in early life he was poor and friendless; but he had within him treasures, the price of which posterity will pay. What were these treasures? His senses: with knowledge of their use and application; observation and experience as their results. He cultivated his senses, and acquired knowledge of things and their effects. He saw their resemblances; classified these, and when he perceived disagreement between them, as he would have done with quarrelsome men, he separated them; he cultivated his sense of hearing by attention to sounds, so that when an agreeable succession and modulation of them struck his ear from a single or combined source, he acquired knowledge of melody and harmony—thence he became a musician. He studied men and their minds, but he looked at them as *things;* he saw their incongruities, their want of proper classification or arrangements; but having more power over *things*, than he had over men and their minds, he smiled at them, and often, by apt analogies, drawn from the exercise of his *senses*, publicly, though delicately, ridiculed them. This was his wit, his imagination. He observed the phenomena of lightning, and recorded these as experience. He was also familiar with the effects of electricity; and marking their resemblance, as you would in the countenance of your companions, he classified them together, and thus, with the universal consent of science, established or discovered their identity. This is the secret of Franklin's scientific fame, and immortality is the reward that posterity will pay him for the discovery."

A Process for varnishing Leather for Belts, Cartridge Boxes, &c.—The varnish for leather is the same as that for carriages, except that it contains less copal, and that the oil used in the varnish, for certain coarse articles, should be a little decomposed.

After having dressed and scraped the leather to be varnished, apply upon the flesh side a thin coat of glue water, to which has been added about an ounce of boiled linseed oil. The leather, when dried, is polished, and successive coatings applied until it becomes very smooth. Then mix one part of strong drying oil, (linseed oil, with a considerable dose of litharge,) and one of copal varnish, in an iron vessel; add well pulverized lampblack and spirits of turpentine, and set the whole over a fire. The leather which during this time has been kept in a closet artificially heated, is now stretched upon a table, a very thin coat of the mixture quickly laid on with a flat brush, immediately replaced in the warm closet, and allowed to dry slowly: when dried it is polished with pomice stone, or, which is better, with charcoal finely pounded and sifted. A second coat is applied in the same way, and the operation finishes with a third coat, which should be very lightly laid on, and be very smooth. The leather is now dried without polishing.

Leather for straps, &c. is sometimes manufactured by being passed between rollers; this enables it to receive a higher degree of polish and smoothness. Sometimes the leather is stained with lampblack mixed in glue water, and finished as we have just described. For articles which are not intended to bend, a greater proportion of copal varnish and more spirits of turpentine are incorporated with the coating mixture. These varnishes are laid on when cold.—[Journal des Connaissances Usuelles.]

MOUNT AUBURN CEMETERY.—The following plan of the Mount Auburn Cemetery, together with the proceedings of the Boston Horticultural Society, and the Address of Judge STORY, are taken from the New-York Farmer and American Gardener's Magazine; and we are sure that it will be read by none with greater interest than by those who read the MECHANICS' MAGAZINE. It can be read by no person who has a taste for eloquence, or who ever reflects upon the subject to which it refers—*the last resting-place of all mankind in this world*,—without producing a salutary influence upon his feelings, and possibly upon his future life.

RURAL CEMETERY.—In our last we alluded to the establishment of a rural cemetery in the immediate vicinity of Boston, and promised a more minute description of it in a subsequent number; we proceed, therefore, to redeem that promise, by giving the following account of the origin of the plan, together with the eloquent address of JUDGE STORY at its consecration, and a plan of the grounds as laid out for cultivation.

Who that reads the following truly appropriate address will not join with us in urging our prominent citizens to step forward and give the weight of their influence to a similar measure? Why not the *New-York*, as well as the BOSTON HORTICULTURAL SOCIETY, adopt a similar measure, and thereby prevent its falling into the hands of speculators?

In the plan, the dotted lines show the CONTEMPLATED paths and avenues, also the contraction of the ponds; and the square dots along the paths and avenues show the lots of 200 square feet purchased by individuals. The other references are as follow: A, Avenues; B, Mount Auburn; C, Harvard Hill; D, Temple Hill; E, Juniper Hill; F, Cedar Hill; G, Pine Hill; H, Laurel Hill; I, Central Square; K, Consecrated Dell; P, Ponds.

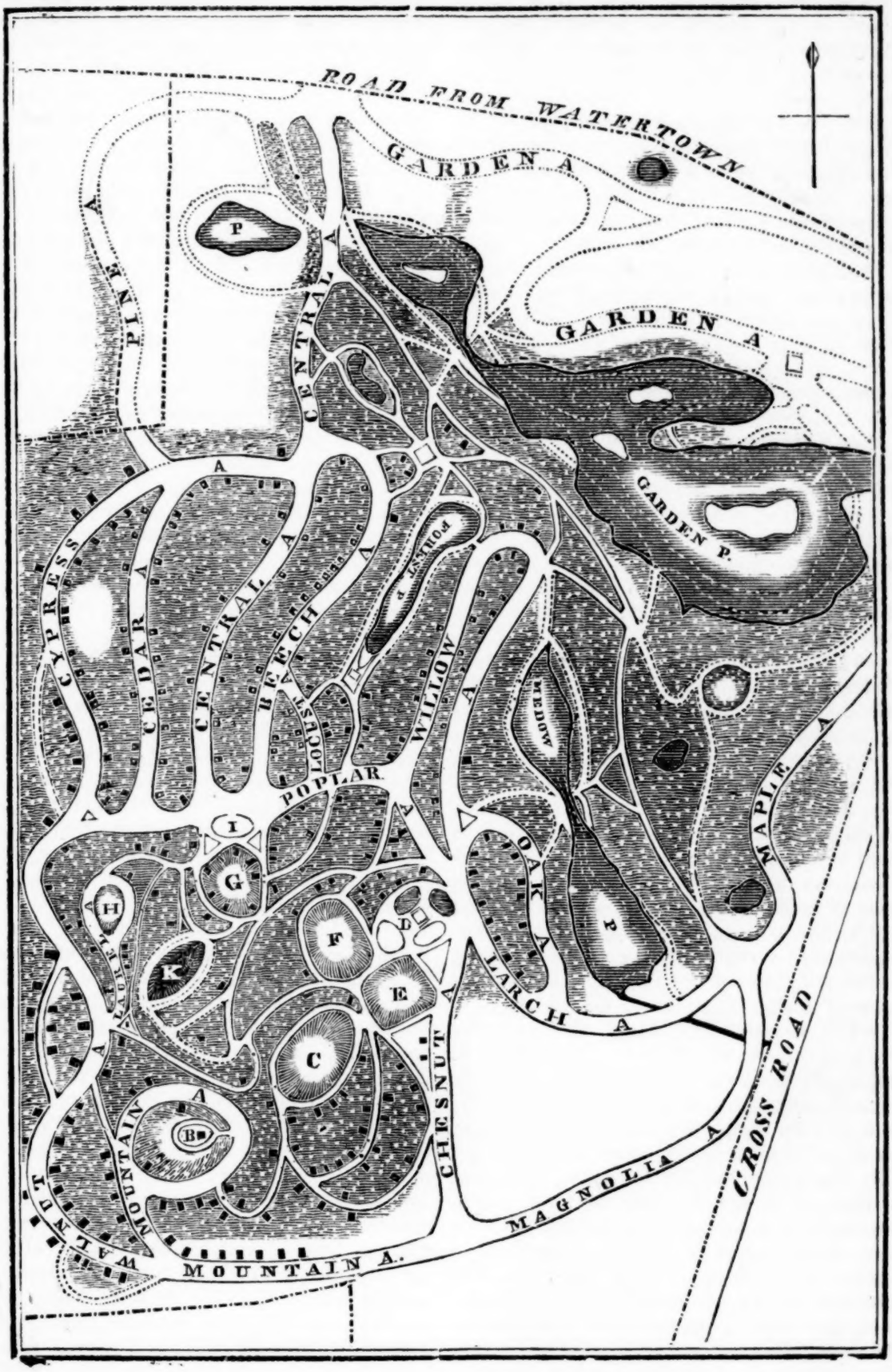
"Six or seven years ago meetings were held and measures taken, to carry into effect the plan of a private Rural Cemetery. But although there appeared to be no want of interest in the design, and of numbers sufficient to effect its execution, yet the scheme was suspended, from the difficulty of obtaining, at that time, a lot of land in all respects eligible for the purpose.

"After the establishment of the Massachusetts Horticultural Society, in 1829, it occurred to some of its members that a cemetery, of the character which had been desired, might with great propriety be instituted under the auspices of this new society, and that by a union of the interests of each institution, the success and permanency of their objects might be reciprocally promoted. Upon a notification, signed by Dr. J. Bigelow and John C. Gray, Esq. a meeting of gentlemen was held at the Exchange Coffee House, November 27, 1830, for the general consideration of the subject. At this meeting it was announced that a tract of ground, of about seventy acres, at the place then called Sweet Auburn, and owned by G. W. Brimmer, Esq. would be placed at the disposal of the society. A committee was appointed at a cotemporaneous meeting of the Horticultural Society, to consider the expediency of making this purchase, and to devise measures for forwarding the design of a Rural Cemetery and Experimental Garden. This committee afterwards obtained leave to fill their own vacancies, and to enlarge their number by the addition of persons not members of the Horticultural Society. A report in behalf of this committee was afterwards made by General H. A. S. Dearborn, President of the Society, and published in the newspapers, in which an extensive and able exposition was made of the advantages of the undertaking.

"At a meeting of persons favorably disposed towards the design, held at the Horticultural Rooms, June 8th, 1831, a strong and general wish was manifested for the immediate prosecution of the undertaking. A committee of twenty was chosen to consider and report upon a general plan of proceedings. The following gentlemen constituted this committee: Messrs. Joseph Story, Daniel Webster, Henry A. S. Dearborn, Samuel Appleton, Charles Lowell, Jacob Bigelow, Edward Everett, George Bond, George W. Brimmer, Abbot Lawrence, Jacob T. Austin, Franklin Dexter, Alexander H. Everett, Charles P. Curtis, Joseph P. Bradlee, John Pierpont, Zebedee Cook, jr. Charles Tappan, Lucius M. Sargeant, and George W. Pratt. This committee subsequently offered the following report, which was accepted, and made the basis of subscription for those who might become proprietors.

"The Committee of the Horticultural Society, to whom was referred the method of raising subscriptions for the Experimental Garden and Cemetery, beg leave to report:

"1. That it is expedient to purchase, for a Garden and Cemetery, a tract of land commonly known by the name of Sweet Auburn, near the road leading from Cambridge to


ROAD FROM WATERTOWN
GARDEN A.
GARDEN A.
GARDEN P.
P
PINE A.
CYPRESS A.
CEDAR A.
CENTRAL A.
BEECH A.
LOCUST A.
POPLAR A.
WILLOW A.
MEADOW
OAK A.
MAPLE A.
LARCH A.
CHESTNUT A.
MAGNOLIA A.
CROSS ROAD
LAUREL A.
WALNUT A.
MOUNTAIN A.
MOUNTAIN A.
I
G
H
K
F
D
E
C
B
P

Watertown, containing about seventy-two acres, for the sum of six thousand dollars; provided this sum can be raised in the manner proposed in the second article of this report.

"2. That a subscription be opened for lots of ground in the said tract, containing not less than two hundred square feet each, at the price of sixty dollars for each lot,—the subscription not to be binding until one hundred lots are subscribed for.

"3. That when a hundred or more lots are taken, the right of choice shall be disposed of at an auction, of which seasonable notice shall be given to the subscribers.

"4. That those subscribers who do not offer a premium for the right of choosing, shall have their lots assigned to them by lot.

"5. That the fee of the land shall be vested in the Massachusetts Horticultural Society, but that the use of the lots, agreeably to an act of the Legislature respecting the same, shall be secured to the subscribers, their heirs, and assigns, forever.

"6. That the land devoted to the purpose of a Cemetery shall contain not less than forty acres.

"7. That every subscriber, upon paying for his lot, shall become a member for life, of the Massachusetts Horticultural Society, without being subject to assessments.

"8. That a Garden and Cemetery Committee, of nine persons, shall be chosen annually, first by the subscribers, and afterwards by the Horticultural Society, whose duty it shall be to cause the necessary surveys and allotments to be made, to assign a suitable tract of land for the Garden of the Society, and to direct all matters appertaining to the regulation of the Garden and Cemetery; and five at least of this committee shall be persons having rights in the Cemetery.

"The tract of land which has received the name of Mount Auburn, is situated on the southerly side of the main road leading from Cambridge to Watertown, and is partly within the limits of each of those towns. Its distance from Boston is about four miles. The place was formerly known by the name of Stone's Woods, the title to most of the land having remained in the family of Stone from an early period after the settlement of the country. Within a few years, the hill and part of the woodland were offered for sale, and were purchased by George W. Brimmer, Esq. whose object was to prevent the destruction of the trees, and to preserve so beautiful a spot for some public or appropriate use. The purchase which has now been made by the Horticultural Society includes between seventy and eighty acres, extending from the road nearly to the banks of Charles river. A portion of the lane situated next to the road, and now under cultivation, is intended to constitute the Experimental Garden of the Horticultural Society. A long water-course extending between this tract and the interior woodland forms a natural boundary, separating the two sections. The inner portion, which is set apart for the purposes of a Cemetery, is covered throughout most of its extent with a vigorous growth of forest trees, many of them of large size, and comprising an unusual variety of kinds. This tract is beautifully undulating in its surface, containing a number of bold eminences, steep acclivities, and deep shadowy vallies. A remarkable natural ridge with a level surface runs through the ground from south-east to north-west, and has for many years been known as a secluded and favorite walk. The principal eminence, called Mount Auburn in the plan, is one hundred and twenty-five feet above the level of Charles river, and commands from its summit one of the finest prospects which can be obtained in the environs of Boston. On one side is the city in full view, connected at its extremities with Charleston and Roxbury. The serpentine course of Charles river, with the cultivated hills and fields rising beyond it, and having the Blue Hills of Milton in the distance, occupies another portion of the landscape. The village of Cambridge, with the venerable edifices of Harvard University, are situated about a mile to the eastward. On the north, at a very small distance, Fresh Pond appears, a handsome sheet of water, finely diversified by its woody and irregular shores. Country seats and cottages, seen in various directions, and especially those on the elevated land at Watertown, add much to the picturesque effect of the scene. It is proposed to erect, on the summit of Mount Auburn, a tower, after some classic model, of sufficient height to rise above the tops of the surrounding trees. This will serve the double purpose of a landmark to identify the spot from a distance, and of an observatory, commanding an uninterrupted view of the country around it. From the foot of this monument will be seen in detail the features of the landscape, as they are successively presented through the different vistas which have been opened among the trees, while, from its summit, a magnificent and unbroken

panorama, embracing one of the most delightful tracts in New-England, will be spread out beneath the eye. Not only the contiguous country, but the harbor and bay of Boston, with their ships and islands, and, in a clear atmosphere, the distant mountains of Wachusett, and probably even of Monadnock, will be comprehended within the range of vision.

"The grounds of the cemetery have been laid out with intersecting avenues, so as to render every part of the wood accessible. These avenues are curved and variously winding in their course, so as to be adapted to the natural inequalities of the surface. By this arrangement the greatest economy of the land is produced, combining at the same time the picturesque effect of landscape gardening. Over the more level portions the avenues are made twenty feet wide, and are suitable for carriage roads. The more broken and precipitous parts are approached by foot-paths, which are six feet in width. These passage-ways are to be smoothly gravelled, and planted on both sides with flowers and ornamental shrubs. Lots of ground, containing each three hundred square feet, are set off as family burial places, at suitable distances, on the sides of the avenues and paths. The perpetual right of inclosing and of using these lots, as places of sepulture, is conveyed to the purchasers of them by the Horticultural Society. It is confidently expected that many of the proprietors will, without delay, proceed to erect upon their lots such monuments and appropriate structures as will give to the place a part of the solemnity and beauty which it is destined ultimately to acquire.

"It has been voted to procure, or construct, a receiving tomb in Boston, and another at Mount Auburn, at which, if desired, funerals may terminate, and in which the remains of the deceased may be deposited until such time as the friends shall choose to direct their removal to the Cemetery; this period, however, not to exceed six months.

"The principal entrance to Mount Auburn will be through a lofty Egyptian gateway, which it is proposed to erect on the main road, at the commencement of the Central Avenue. Another entrance or gateway is provided on the cross road, at the eastern foot of the hill. Whenever the funds of the corporation shall justify the expense, it is proposed that a small Grecian or Gothic Temple shall be erected on a conspicuous eastern eminence, which in reference to this allotment has received the prospective name of Temple Hill.

"The recent purchase and disposition of the grounds at Mount Auburn has effected the consummation of the two designs, which, for a considerable time, have been cherished by numerous members of the community in the city of Boston and its vicinity. One of these is the institution of a garden for the promotion of Scientific Horticulture; the other, the establishment in the environs of the city of a retired and ornamented place of sepulture."

Address of Judge Story.

"My Friends,—The occasion which brings us together has much in it calculated to awaken our sensibilities, and cast a solemnity over our thoughts.

"We are met to consecrate these grounds exclusively to the service and repose of the dead.

"The duty is not new; for it has been performed for countless millions. The scenery is not new; for the hill and the valley, the still, silent dell, and the deep forest, have often been devoted to the same pious purpose. But that which must always give it a peculiar interest is, that it can rarely occur except at distant intervals; and, whenever it does, it must address itself to feelings intelligible to all nations, and common to all hearts.

"The patriarchal language of four thousand years ago is precisely that to which we would now give utterance. We are 'strangers and sojourners' here. We have need of 'a possession of a burying-place, that we may bury our dead out of our sight.' Let us have 'the field, and the cave which is therein; and all the trees that are in the field, and that are in the borders round about;' and let them 'be made sure for a possession of a burying-place.'

"It is the duty of the living thus to provide for the dead. It is not a mere office of pious regard for others; but it comes home to our own bosoms, as those who are soon to enter upon the common inheritance.

"If there are any feelings of our nature, not bounded by earth, and yet stopping short of the skies, which are more strong and more universal than all others, they will be found in our solicitude as to the time and place and manner of our death; in the desire to die in the arms of our friends; to have the last sad offices to our remains performed by their affection; to repose in the

land of our nativity; to be gathered to the sepulchres of our fathers. It is almost impossible for us to feel, nay, even to feign, indifference on such a subject.

"Poetry has told us this truth in lines of transcendant beauty and force, which find a response in every breast:

'For who, to dumb Forgetfulness a prey,
This pleasing, anxious being e'er resigned,
Left the warm precincts of the cheerful day,
Nor cast one longing, ling'ring look behind?

'On some fond breast the parting soul relies;
Some pious drops the closing eye requires;
E'en from the tomb the voice of Nature cries;
E'en in our ashes live their wonted fires.'

"It is in vain that philosophy has informed us, that the whole earth is but a point in the eyes of its Creator,—nay, of his own creation; that, wherever we are,—abroad or at home,—on the restless ocean, or the solid land,—we are still under the protection of his Providence and safety, as it were, in the hollow of his hand. It is in vain that religion has instructed us, that we are but dust, and to dust we shall return,—that whether our remains are scattered to the corners of the earth, or gathered in sacred urns, there is a sure and certain hope of a resurrection of the body and a life everlasting. These truths, sublime and glorious as they are, leave untouched the feelings of which I have spoken, or rather they impart to them a more enduring reality. Dust as we are, the frail tenements which enclose our spirits but for a season, are dear, are inexpressibly dear to us. We derive solace, nay, pleasure, from the reflection, that when the hour of separation comes, these earthly remains will still retain the tender regard of those whom we leave behind; that the spot where they shall lie will be remembered with a fond and soothing reverence; that our children will visit it in the midst of their sorrows; and our kindred in remote generations feel that a local inspiration hovers round it.

"Let him speak who has been on a pilgrimage of health to a foreign land. Let him speak, who has watched at the couch of a dying friend, far from his chosen home. Let him speak, who has committed to the bosom of the deep, with a sudden, startling plunge, the narrow shroud of some relative or companion. Let such speak, and they will tell you, that there is nothing which wrings the heart of the dying,—aye, and of the surviving,— with sharper agony than the thought that they are to sleep their last sleep in the land of strangers, or in the unseen depths of the ocean.

"'Bury me not, I pray thee,' said the patriarch Jacob, 'bury me not in Egypt: but I will lie with my fathers. And thou shalt carry me out of Egypt; and bury me in their burying-place.'—'There they buried Abraham and Sarah his wife; there they buried Isaac and Rebecca his wife; and there I buried Leah.'

"Such are the natural expressions of human feeling, as they fall from the lips of the dying. Such are the reminiscences that for ever crowd on the confines of the passes to the grave. We seek again to have our home there with our friends, and to be blessed by a communion with them. It is a matter of instinct, not of reasoning. It is a spiritual impulse, which supercedes belief, and disdains question.

"But it is not chiefly in regard to the feelings belonging to our own mortality, however sacred and natural, that we should contemplate the establishment of repositories of this sort. There are higher moral purposes, and more affecting considerations, which belong to the subject. We should accustom ourselves to view them rather as means than as ends; rather as influences to govern human conduct, and to moderate human suffering, than as cares incident to a selfish foresight.

"It is to the living mourner—to the parent, weeping over his dear dead child—to the husband, dwelling in his own solitary desolation—to the widow, whose heart is broken by untimely sorrow—to the friend, who misses at every turn the presence of some kindred spirit,—it is to these, that the repositories of the dead bring home thoughts full of admonition, of instruction, and, slowly, but surely, of consolation also. They admonish us, by their very silence, of our own frail and transitory being. They instruct us in the true value of life, and in its noble purposes, its duties and its destination. They spread around us, in the reminiscences of the past, sources of pleasing though melancholy reflection.

"We dwell with pious fondness on the characters and virtues of the departed; and, as time interposes its growing distances between us and them, we gather up with more solicitude the broken fragments of memory, and weave, as it were, into our very hearts, the threads of their history. As we sit down by their graves, we seem to hear the tones of their affection whispering in our ears.

We listen to the voice of their wisdom, speaking in the depths of our souls. We shed our tears; but they are no longer the burning tears of agony. They relieve our drooping spirits, and come no longer over us with a deathly faintness. We return to the world, and we feel ourselves purer, and better, and wiser, from this communion with the dead.

"I have spoken of but feelings and associations common to all ages, and all generations of men—to the rude and the polished—to the barbarian and the civilized—to the bond and the free—to the inhabitant of the dreary forests of the north, and the sultry regions of the south—to the worshipper of the sun, and the worshipper of idols—to the Heathen, dwelling in the darkness of his cold mythology, and to the Christian rejoicing in the light of the true God. Every where we trace them in the characteristic remains of the most distant ages and nations, and as far back as human history carries its traditionary outlines. They are found in the barrows, and cairns, and mounds of olden times, reared by the uninstructed affection of savage tribes; and, every where, the spots seem to have been selected with the same tender regard to the living and the dead; that the magnificence of nature might administer comfort to human sorrow, and incite human sympathy.

"The aboriginal Germans buried their dead in groves consecrated by their priests. The Egyptians gratified their pride and soothed their grief, by interring them in their Elysian fields, or embalming them in their vast catacombs, or inclosing them in their stupendous pyramids, the wonder of all succeeding ages. The Hebrews watched with religious care over their places of burial. They selected for this purpose ornamented gardens, and deep forests, and fertile valleys, and lofty mountains; and they still designate them with a sad emphasis, as the "House of the Living." The ancient Asiatics lined the approaches to their cities with sculptured sarcophagi, and mausoleums, and other ornaments embowered in shrubbery, traces of which may be seen among their magnificent ruins. The Greeks exhausted the resources of their exquisite art in adorning the habitations of the dead. They discouraged interments within the limits of their cities; and consigned their reliques to shady groves in the neighborhood of murmuring streams and mossy fountains, close by the favorite resorts of those who were engaged in the study of philosophy and nature, and called them, with the elegant expressiveness of their own beautiful language, CEMETERIES,* or "Places of Repose." The Romans, faithful to the example of Greece, erected the monuments to the dead in the suburbs of the eternal city, (as they proudly denominated it,) on the sides of their spacious roads, in the midst of trees and ornamental walks and ever-varying flowers. The Appian way was crowded with columns, and obelisks, and cenotaphs, to the memory of her heroes and sages; and, at every turn, the short but touching inscription met the eye,—Siste, Viator—Pause, Traveller—inviting at once to sympathy and thoughtfulness. Even the humblest Roman could read on the humblest grave-stone the kind offering—"May the earth lie lightly on these remains!"† And the Moslem successors of the emperors, indifferent as they may be to the ordinary exhibitions of the fine arts, place their burying-grounds in rural retreats, and embellish them with studious taste as a religious duty. The cypress is planted at the head and foot of every grave, and waves with a mournful solemnity over it. These devoted grounds possess an inviolable sanctity. The ravages of war never reach them; and victory and defeat equally respect the limits of their domain. So that it has been remarked with equal truth and beauty, that while the cities of the living are subject to all the desolations and vicissitudes incident to human affairs, the cities of the dead enjoy an undisturbed repose, without even the shadow of change.

"But I will not dwell upon facts of this nature. They demonstrate, however, the truth of which I have spoken. They do more; they furnish reflections suitable for our own thoughts on the present occasion.

"If this tender regard for the dead be so absolutely universal, and so deeply founded in human affection, why is it not made to exert a more profound influence on our lives? Why do we not enlist it with more persuasive energy in the cause of human improvement? Why do we not enlarge it as a source of religious consolation? Why do we not make it a more efficient instrument to elevate ambition, to stimulate genius, and to dignify learning? Why do we not connect it indissolubly with associations which charm us in nature and engross us in art? Why do we

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* κοίμετερία—literally, places of sleep.

† "Sit tibi terra levis."

not dispel from it that unlovely gloom, from which our hearts turn as from a darkness that ensnares, and a horror that appals, our thoughts?

"To many, nay, to most of the heathen, the burying-place was the end of all things. They indulged no hope, at least, no solid hope, of any future intercourse or re-union with their friends. The farewell at the grave was a long and an everlasting farewell. At the moment when they breathed it, it brought to their hearts a startling sense of their own wretchedness. Yet, when the first tumults of anguish were passed, they visited the spot and strewed flowers, and garlands, and crowns, around it, to assuage their grief, and nourish their piety. They delighted to make it the abode of the varying beauties of nature; to give it attractions which should invite the busy and the thoughtful; and yet, at the same time, afford ample scope for the secret indulgence of sorrow.

"Why should not Christians imitate such examples? They have far nobler motives to cultivate moral sentiments and sensibilities; to make cheerful the path-ways to the grave; to combine with deep meditations on human mortality, the sublime consolations of religion. We know, indeed, as they did of old, that 'man goeth to his long home, and the mourners go about the streets.' But that home is not an everlasting home; and the mourners may not weep as those who are without hope. What is the grave to Us, but a thin barrier dividing Time from Eternity, and Earth from Heaven? What is it but 'the appointed place of rendezvous, where all the travellers on life's journey meet' for a single night of repose—

> 'Tis but a night—a long and moonless night,
> We make the grave our bed, and then are gone.'

"Know we not

> ——— 'The time draws on
> When not a single spot of burial earth,
> Whether on land, or in the spacious sea,
> But must give up its long committed dust
> Inviolate?'

—"Why then should we darken with systematic caution all the avenues to these repositories? Why should we deposite the remains of our friends in loathsome vaults, or beneath the gloomy crypts and cells of our churches, where the human foot is never heard, save when the sickly taper lights some new guest to his appointed apartment, and 'lets fall a supernumerary horror' on the passing procession? Why should we measure out a narrow portion of earth for our grave-yards in the midst of our cities, and heap the dead upon each other with a cold, calculating parsimony, disturbing their ashes, and wounding the sensibilities of the living? Why should we expose our burying grounds to the broad glare of day, to the unfeeling gaze of the idler, to the noisy press of business, to the discordant shouts of merriment, or to the baleful visitations of the dissolute? Why should we bar up their approaches against real mourners, whose delicacy would shrink from observation, but whose tenderness would be soothed by secret visits to the grave, and holding converse there with their departed joys? Why all this unnatural restraint upon our sympathies and sorrows, which confines the visit to the grave to the only time in which it must be utterly useless —when the heart is bleeding with fresh anguish, and is too weak to feel, and too desolate to desire consolation?

"It is painful to reflect, that the Cemeteries in our cities, crowded on all sides by the overhanging habitations of the living, are walled in only to preserve them from violation. And that in our country towns they are left in a sad, neglected state, exposed to every sort of intrusion, with scarcely a tree to shelter their barrenness, or a shrub to spread a grateful shade over the new-made hillock.

"These things were not always so among Christians. They are not worthy of us. They are not worthy of Christianity in our day. There is much in these things that casts a just reproach upon us in the past. There is much that demands for the future a more spiritual discharge of our duties.

"Our Cemeteries rightly selected, and properly arranged, may be made subservient to some of the highest purposes of religion and human duty. They may preach lessons to which none may refuse to listen, and which all that live must hear. Truths may be there felt and taught in the silence of our own meditations, more persuasive and more enduring than ever flowed from human lips. The grave hath a voice of eloquence, nay, of superhuman eloquence, which speaks at once to the thoughtlessness of the rash, and the devotion of the good; which addresses all times, and all ages, and all sexes; which tells of wisdom to the wise, and of comfort to the afflicted; which warns us of our follies and our dangers; which whispers to us in accents of peace, and alarms us in tones of terror; which steals with a healing balm into the stricken heart, and lifts up and sup-

ports the broken spirit; which awakens a new enthusiasm for virtue, and disciplines us for its severer trials and duties; which calls up the images of the illustrious dead, with an animating presence for our example and glory; and which demands of us as men, as patriots, as Christians, as immortals, that the powers given by God should be devoted to his service, and the minds created by his love should return to him with larger capacities for virtuous enjoyment, and with more spiritual and intellectual brightness.

"It should not be for the poor purpose of gratifying our vanity or pride, that we should erect columns, and obelisks, and monuments, to the dead; but that we may read thereon much of our own destiny and duty. We know that man is the creature of associations and excitements. Experience may instruct, but habit, and appetite, and passion, and imagination, will exercise a strong dominion over him. These are the Fates, which weave the thread of his character, and unravel the mysteries of his conduct. The truth, which strikes home, must not only have the approbation of his reason, but it must be embodied in a visible, tangible, practical form. It must be felt as well as seen. It must warm as well as convince.

"It was a saying of Themistocles, that the trophies of Miltiades would not suffer him to sleep. The feeling thus expressed, has a deep foundation in the human mind; and, as it is well or ill directed, it will cover us with shame or exalt us to glory. The deeds of the great attract but a cold and listless admiration, when they pass in historical order before us like moving shadows. It is the trophy and the monument which invests them with a substance of local reality. Who, that has stood by the tomb of Washington on the quiet Potomac, has not felt his heart more pure, his wishes more aspiring, his gratitude more warm, and his love of country touched by a holier flame? Who, that should see erected in shades like these, even a cenotaph to the memory of a man, like Buckminster, that prodigy of early genius, would not feel that there is an excellence over which death hath no power, but which lives on through all time, still freshening with the lapse of ages.

"But passing from those, who by their talents and virtues have shed lustre on the annals of mankind, to cases of mere private bereavement, who that should deposit in shades like these the remains of a beloved friend, would not feel a secret pleasure in the thought, that the simple inscription to his worth would receive the passing tribute of a sigh from thousands of kindred hearts? That the stranger and the traveller would linger on the spot with a feeling of reverence? That they, the very mourners themselves, when they should revisit it, would find there the verdant sod, and the fragrant flower, and the breezy shade? That they might there, unseen, except of God, offer up their prayers, or indulge the luxury of grief? That they might there realize, in its full force, the affecting beatitude of the scriptures; 'Blessed are they that mourn, for they shall be comforted?'

"Surely, surely, we have not done all our duty, if there yet remains a single incentive to human virtue, without its due play in the action of life, or a single stream of happiness, which has not been made to flow in upon the waters of affliction.

"Considerations like those which have been suggested have for a long time turned the thoughts of many distinguished citizens to the importance of some more appropriate places of sepulture. There is a growing sense in the community of the inconveniences, and painful associations, not to speak of the unhealthiness of interments beneath our churches. The tide which is flowing with such a steady and widening current into the narrow peninsula of our metropolis, not only forbids the enlargement of the common limits, but admonishes us of the increasing dangers to the ashes of the dead from its disturbing movements. Already in other cities the church-yards are closing against the admission of new incumbents, and begin to exhibit the sad spectacle of promiscuous ruins and intermingled graves.

"We are, therefore, but anticipating at the present moment the desires, nay, the necessities, of the next generation. We are but exercising a decent anxiety to secure an inviolable home for ourselves and our posterity. We are but inviting our children and their descendants to what the Moravian Brothers have, with such exquisite propriety, designated as 'the Field of Peace.'

"A rural Cemetery seems to combine in itself all the advantages which can be proposed to gratify human feelings, or tranquilize human fears; to secure the best religious influences, and to cherish all those associations which cast a cheerful light over the darkness of the grave.

"And what spot can be more appropriate than this, for such a purpose? Nature

seems to point it out with significant energy, as the favorite retirement for the dead. There are around us all the varied features of her beauty and grandeur—the forest-crowned height; the abrupt acclivity; the sheltered valley; the deep glen; the grassy glade; and the silent grove. Here are the lofty oak, the beech, that 'wreaths its old fantastic roots so high,' the rustling pine, and the drooping willow;—the tree, that sheds its pale leaves with every autumn, a fit emblem of our own transitory bloom; and the evergreen, with its perennial shoots, instructing us, that 'the wintry blast of death kills not the buds of virtue.' Here is the thick shrubbery to protect and conceal the new made grave; and there is the wild-flower creeping along the narrow path, and planting its seeds in the upturned earth. All around us there breathes a solemn calm, as if we were in the bosom of a wilderness, broken only by the breeze as it murmurs through the tops of the forest, or by the notes of the warbler pouring forth his matin or his evening song.

"Ascend but a few steps and what a change of scenery to surprize and delight us. We seem, as it were, in an instant, to pass from the confines of death to the bright and balmy regions of life. Below us flows the winding Charles with its rippling current, like the stream of time hastening to the ocean of eternity. In the distance, the city,—at once the object of our admiration and our love,—rears its proud eminences, its glittering spires, its lofty towers, its graceful mansions, its curling smoke, its crowded haunts of business and pleasure, which speak to the eye, and yet leave a noiseless loneliness on the ear. Again we turn, and the walls of our venerable University rise before us, with many a recollection of happy days passed there in the interchange of study and friendship, and many a grateful thought of the affluence of its learning, which has adorned and nourished the literature of our country. Again we turn, and the cultivated farm, the neat cottage, the village church, the sparkling lake, the rich valley, and the distant hills, are before us through opening vistas; and we breathe amidst the fresh and varied labors of man.

"There is, therefore, within our reach, every variety of natural and artificial scenery, which is fitted to awaken emotions of the highest and most affecting character. We stand, as it were, upon the borders of two worlds; and as the mood of our minds may be, we may gather lessons of profound wisdom by contrasting the one with the other, or indulge in the dreams of hope and ambition, or solace our hearts by melancholy meditations. Who is there that, in the contemplation of such a scene, is not ready to exclaim with the enthusiasm of the poet,

> 'Mine be the breezy hill, that skirts the down,
> Where a green grassy turf is all I crave,
> With here and there a violet bestrown,
> Fast by a brook, or fountain's murmuring wave,
> And many an evening sun shine sweetly on my grave.'

"And we are met here to consecrate this spot, by these solemn ceremonies, to such a purpose. The Legislature of this Commonwealth, with a paternal foresight, has clothed the Horticultural Society with authority (if I may use its own language) to make a perpetual dedication of it, as a Rural Cemetery or Burying-Ground, and to plant and embellish it with shrubbery, and flowers, and trees, and walks, and other rural ornaments. And I stand here, by the order and in behalf of this Society, to declare that, by these services, it is to be deemed henceforth and for ever so dedicated. Mount Auburn, in the noblest sense, belongs no longer to the living, but to the dead. It is a sacred, it is an eternal trust. It is consecrated ground. May it remain for ever inviolate!

"What a multitude of thoughts crowd upon the mind in the contemplation of such a scene. How much of the future, even in its far distant reaches, rises before us with all its persuasive realities. Take but one little narrow space of time, and how affecting are its associates! Within the flight of one half century, how many of the great, the good, and the wise, will be gathered here! How many in the loveliness of infancy, the beauty of youth, the vigor of manhood, and the maturity of age, will lie down here, and dwell in the bosom of their mother earth! The rich and the poor, the gay and the wretched, the favorites of thousands, and the forsaken of the world, the stranger in his solitary grave, and the patriarch surrounded by the kindred of a long lineage! How many will here bury their brightest hopes, or blasted expectations! How many bitter tears will here be shed! How many agonizing sighs will here be heaved! How many trembling feet will cross the pathways, and, returning, leave behind them the dearest objects of their reverence or their love!

"And if this were all, sad indeed, and funereal, would be our thoughts; gloomy indeed would be these shades, and desolate these prospects.

"But—thanks be to God!—the evils which

he permits have their attendant mercies, and are blessings in disguise. The bruised reed will not be laid utterly prostrate. The wounded heart will not always bleed. The voice of consolation will spring up in the midst of the silence of these regions of death. The mourner will revisit these shades with a secret, though melancholy pleasure. The hand of friendship will delight to cherish the flowers and the shrubs that fringe the lowly grave, or the sepultured monument. The earliest beams of the morning will play upon these summits with a refreshing cheerfulness; and the lingering tints of evening hover on them with a tranquilizing glow. Spring will invite thither the footsteps of the young by its opening foliage; and autumn detain the contemplative by its latest bloom. The votary of learning and science will here learn to elevate his genius by the holiest studies. The devout will here offer up the silent tribute of pity, or the prayer of gratitude. The rivalries of the world will here drop from the heart; the spirit of forgiveness will gather new impulses; the selfishness of avarice will be checked; the restlessness of ambition will be rebuked; vanity will let fall its plumes; and pride, as it sees "what shadows we are, and what shadows we pursue," will acknowledge the value of virtue as far, immeasurably far, beyond that of fame.

"But that which will be ever present, pervading these shades like the noon-day sun, and shedding cheerfulness around, is the consciousness, the irrepressible consciousness, amidst all these lessons of human mortality, of the higher truth, that we are beings, not of time, but of eternity—"That this corruptible must put on incorruption, and this mortal must put on immortality." That this is but the threshold and starting point of an existence, compared with whose duration the ocean is but as a drop, nay, the whole creation an evanescent quantity.

"Let us banish, then, the thought, that this is to be the abode of a gloom, which will haunt the imagination by its terrors, or chill the heart by its solitude. Let us cultivate feelings and sentiments more worthy of ourselves, and more worthy of Christianity. Here let us erect the memorials of our love, and our gratitude, and our glory. Here let the brave repose who have died in the cause of their country. Here let the statesman rest, who has achieved the victories of peace, not less renowned than war. Here let genius find a home, that has sung immortal strains, or has instructed with still diviner eloquence. Here let learning and science, the votaries of inventive art, and the teacher of the philosophy of nature, come. Here let youth and beauty, blighted by premature decay, drop, like tender blossoms, into the virgin earth; and here let age retire, ripened for the harvest. Above all, here let the benefactors of mankind, the good, the merciful, the meek, the pure in heart, be congregated; for to them belongs an undying praise. And let us take comfort, nay, let us rejoice, that in future ages, long after we are gathered to the generations of other days, thousands of kindling hearts will here repeat the sublime declaration, 'Blessed are the dead that die in the Lord, for they rest from their labors; and their works do follow them.'"

Family Steamer.—Scarcely ever (says the Nashville Banner) have we seen a little apparatus so admirably adapted, for its simplicity, its easy application, and its various and important uses, to the convenience and comfort of the neat and industrious housewife, as that which has recently fallen under our notice with the above appropriate title. It is a portable steam generator, whose principal object is to assist in creating and preserving cleanliness, to destroy noxious insects and vermin, and to prevent their increase. It is used without trouble or inconvenience, and supercedes the annoying application of water in many cases. That vexatious but indispensable ceremony, which is after all too often ineffectual, the cleaning of bedsteads, may be performed most thoroughly by the aid of this apparatus, without taking them apart or removing them, and without the slightest injury to the floor or carpet upon which they stand. Not a bug or other insect can possibly escape the searching and destructive power of this instrument. For cleansing furniture, removing spots from paint, purifying varnish, cleaning windows, and looking-glasses, picture frames, maps, &c. it is most completely adapted. Its penetrating power is truly wonderful. The smallest crack or fissure may be thoroughly searched, and every thing harbored there effectually removed. It may be useful, too, to destroy worms, which so often infest fruit trees, without injuring the trees themselves; and to remove skippers from bacon without affecting the meat. In fine, in those numerous essential family operations, which, while they contribute to neatness, health, and comfort, are so often full of trouble and vexation to the matron, and to all about her, it is

an almost invaluable auxiliary, and when it shall be introduced into general use, we have no doubt it will rank among the most valuable and indispensible articles of housewifery. It is capable likewise of being employed in many cooking operations to great advantage. It will, for example, boil eggs or potatoes with great ease, and in a most excellent manner.

HUMAN STRUCTURE.—Weak and ignorant as thou art, oh man! humble as thou oughtest to be, oh child of the dust! wouldest thou raise thy thoughts to infinite wisdom—wouldest thou see Omnipotence displayed before thee,—contemplate thine own frame!

Fearfully and wonderfully art thou made: Praise therefore thy Creator with awe, and rejoice before him with reverence.

Wherefore of all creatures art thou only erect, but that thou shouldest behold all his works! wherefore art thou to behold, but that thou mayest admire them! wherefore to admire, but that thou mayest adore their and thy Creator!

Wherefore is consciousness reposed in thee alone, and whence is it derived to thee?

'Tis not in flesh to think—'tis not in bones to reason. The lion knoweth not that worms shall eat him; the ox perceiveth not that he is fed for slaughter.

Something is added to thee unlike to what thou seest; something informs thy clay, higher than all that is the object of thy senses. Behold, what is it?

The body remaineth perfect after this is fled; therefore it is no part of the body. It is immaterial—therefore eternal. It is free to act—therefore accountable for its actions.

Knoweth the ass the use of food, because his teeth mow down the herbage? or standeth the crocodile erect, although his back bone is as straight as thine?

God formed thee as he had formed these; after them all thou wast created: superiority and command were given thee over all; and of his own breath did he communicate to thee thy principle of knowledge.

Know thyself then the pride of his creation—the link uniting divinity and matter. Behold a part of God himself within thee; remember thine own dignity, nor dare to descend unto evil.

Who planted terror in the tail of the serpent? Who clothed the neck of the horse with thunder? Even He who hath instructed thee to crush the one under thy feet, and to tame the other to thy purposes.

IMPROVED MANUFACTURE OF METALLIC RAILINGS FOR RAILROADS.—In this improvement the rails are to be made as they now are, and the chairs as they now are. The latter shall be fastened, as usual, into masses of stone or wood, and the rail to be secured into these chairs, as at present. But, for further security, that part of the rail which sits in the chair, and fits into it, and is secured by nuts, and screws, and pins, as at present, is to have a long rod of malleable iron fastened to it, and that rod made to penetrate deep into the centre of the chair by means of a hole prepared to receive it. The bolt which fastens the rail to the chair is to pass through this perpendicular rod. Again, half way between each chair, a brace, or fastening, in the rail is to be made; at this brace should meet the ends of two rods, the other ends of which should be fastened to the chair at each extremity of the rail; thus the rail is fixed in its place by the perpendicular rod, as far as regards its ends, and it is kept down in the middle by these diagonal rods, which rise at their junction with the rail, and dip at each end to the chairs whereto they are secured. It is also necessary to keep the two rails of the road in their true position, with regard to each other, and this is effected by horizontal rods of the same material with the other, capable of bearing the same weight and sustaining a similar force; and these are secured to the rail at the braces, that is, where the junction of the diagonal rod with the rails is formed, and so passed from the brace on this side of the road, to the brace on that, binding the two rails together; or, the ends may be secured to the opposite chair with the same effect. The whole of these braces, chairs, bolts, and rods, form what is called a compound railroad, and though, in the first instance, increasing the cost, yet as they prevent the necessity of repair, and greatly add to security, durability, and utility of the road, the suggestion is an important one.—[New Monthly Magazine.]

NEW CEMENT.—The late conquest of Algiers by the French has made known a new cement used in the public works of that city. It is composed of two parts of ashes, three of clay, and one of sand. This composition, called by the Moors "Fabbi," being again mixed with oil, resists the inclemencies of the weather better than marble itself.

A Popular Guide to the Observation of Nature. By ROBERT MUDIE. New-York, J. & J. Harper. 18mo. pp. 343.

Original compositions, in these days of book-making and compiling, are very rarely to be met with. We are agreeably surprized to find that in this volume we have more of it than we have found in so small a compass for a length of time. Mr. Mudie is favorably known as an author to most of the reading public in England; and the volume now before us ought to class him among those worthies whose writings are so deservedly held in estimation by the reading public.

Our author, in his preface, states concisely and correctly the views he has taken up in this little volume, which ought to be the pocket companion of all who are fond of observing nature. We cannot do better than let Mr. Mudie speak for himself.

"The sweetest hours of a man's converse with nature are those during which he has it all to himself. It is then that the career of thought runs free and far as the light of heaven; and vanity is subdued, and bitterness is sweetened, and hope is elevated, by the comparison of one's own little acquirements and cares, with the mighty expanse around, and of the perfect nothingness of this life in respect to that which then rises clearly and convincingly in the anticipation.

"That is the feeling of natural objects which I have wished to excite and encourage: if that end could be seen and kept in view, the observation of the facts would be a very easy matter; and, as every person must *begin* observation in his own way, or else lose all the pleasure of it, the less of detail which was mingled with the attempt to excite the feeling, it seemed to me the better. Following my own judgment on a subject which is so perfectly original, that, so far as I know, there is not a book or even a page expressly on it, I may be wrong, and may have failed; but even in that case I shall not feel so much humbled by absolute failure in an original attempt, as I should have done at inferiority in an imitation.

"The plan which I have adopted has been to throw momentary glances on those portions of nature which struck me as capable of reflecting the greatest breadth and brilliancy of light; and such as I thought the most likely to induce the reader (and more especially the young reader) to return again to the subjects, and work out the details for himself. I have studiously avoided system, because it is to be wished that every one should enter upon the observation of nature unfettered; and I have also been anxious to steer as clear as possible, not only of hypotheses, but of theories."

Whatever situation in life we may be placed in, whether in the height of prosperity or smarting under the ills of adversity, the mind will always find relief and pleasure in observing nature.—

"If we do not observe nature, we incur disgrace as well as suffer loss,—we are ungrateful to our Maker, and we are unworthy of ourselves. Wherefore were the organs and faculties of observation given us, if we do not use them? The senses, though, as we have them, without cost or study or effort on our part, and so are apt to undervalue them, are, in reality, choice gifts; and the productions of nature are so admirably fitted for the gratification of those senses, that it is altogether impossible not to perceive that the one must have been made for the other.

"Why was every tint and tone of color so mingled in the light of day as that they all come out clear and perfect, and tell us, not merely of substance, but of space? and wherefore, when the sky is clouded and the blackness of darkness shades the landscape, is the arch of Hope with its sevenfold glory set in the rain cloud, if it be not for us to look, and admire, and learn, and love? Why does the rose give forth its odor, and the scent of the lavender and of the mignionette steal viewless upon the still air around us, and the blooming bean and the new-mown hay outscent all the preparations of the apothecary, if it be not to wile us unto the garden and the field, in order that we may breathe health, and at the same time cull pleasure and instruction there? Wherefore sings the breeze in the forest, why whispers the zephyr among the reeds, and how comes it that the caves and hollows of the barren mountains give out their tones, as if the earth were one musical instrument of innumerable strings, if it be not to tempt us forth in order to learn, how ever-fair, ever-new, and ever-informing, that great instructress is who speaks to all the senses at one and the same instant!

"And the pleasure goes deeper—strikes more home—cleaves more closely—remains more permanently—than can be supposed of the external organ of sense. So exquisite and at the same time so mysterious an action is life, that it does not appear that the same particle of matter can abide with it for two moments of time that can be separated, or

considered as a succession even in thought. It is probable that the same material eye never sees two successive objects; that the same olfactory surface never conveys two successive odors; that the same material ear never hears two successive sounds; and that the same sentient palate never tastes, or the same sentient finger touches, twice. It is probable that they perform their offices and are gone—dissipated into the thin air, or absorbed by those vessels which, ramified all over the body, collect the waste from every part; and by one of the most beautiful processes in nature, constantly remove death out of the body, while the equally wonderful system of nutrition is at the same time every where furnishing the materials of life.

"But although those individual portions of matter are far too minute for the cognizance of any eye or of any microscope; and though, as composing our organs of observation, they are more fleeting than observation itself, yet they are faithful to the mind, and their memory never perishes.

"This is an exceedingly curious as well as an exceedingly interesting speculation; and, even if we had no more, it alone would be sufficient to make us happy. The matter which thus passes from death to death through life, and is not a measurable moment on its passage, bears upon its invisible and rapid wings all the information that we receive, and all the happiness that we enjoy. It delights us with softness in touching, with raciness in tasting, with perfume in smelling, with music in hearing, and with all the world in seeing; and what would we, what can we have more than that?

"Thus, as the ACT OF LIFE is, as it were, not a matter measurable in duration, the quantity of happiness that we enjoy is not a sum of measurable durations; and thus it has nothing to do with time, in the common way of estimating it by the visible motion of visible matter. It is said or fabled of the ancient Scythians, that they slew the wise in order to inherit their wisdom, and the strong in order to inherit their strength; but if we would only use our senses—our powers of observation aright—we might inherit the wisdom and the strength of all past ages, as well as those of the present, and even behold and grasp forward into futurity without ever injuring a hair of any living creature. In that way an observant man may and does actually concentrate more enjoyment into one brief hour, nay, into one immeasurable moment, than a dull and careless man drawls out of his three-score and ten years. And it is in the observation of nature only that this unbounded happiness, this happiness which time cannot measure or space bound, is to be found out. All that is of human making or human possession is measurable, and we speedily get to the end of its pleasure; but, even in this world, the pleasure of nature is absolutely to our fondest wish—infinite and eternal."

Mr. Mudie eloquently and beautifully describes the harmony of nature thus:

"The unity of purpose with which even things which, to our observation, when we think of them singly, would appear to be of the most opposite character, work in nature, is one of the most delightful rewards of observing them in their combinations. The sun, the moon, and the planets, all work together in producing days and years, so that all the living creatures, vegetable and animal, may have their due times and seasons of activity and repose. The night restores from the fatigue of the past day, and tunes all the powers of nature for the day which is to come. The winter howls in storms, and the spring is inconstant with sunshine and showers, only that the summer may bloom in splendor, and the autumn ripen the seeds of young life for the coming year.

"Of all those appearances which, blending together, produce so much beauty, and beauty so constantly varying, and yet so constant in its succession that it flows on in one unbroken stream, and which, as we observe it, receives, in our knowledge of it, an increase every moment, just as a river gains a rill from every dell that it passes, we cannot say that any one is the cause of any other. When we push our observation of them, and our reflection on them, as far as human knowledge can go, we find that they all equally demand causes; and that nothing but A UNIVERSAL CAUSE could have produced them, or can satisfy our minds when we come to the bourne where observation stops. And whithersoever we direct our contemplation, upwards or downwards, forwards or backwards, in the extension of space, or in the succession of time, we really can find no boundary—no greatest, no smallest, no first, no last; and yet, as appearance follows appearance in time, we find that the whole are in succession, and that nothing that now is could have been, if something had not been before it; and yet,—though any one of those successions of appearances (which we call the laws of nature) can be suspended by the

action or resistance of some, almost any of the others, no one of them can be destroyed or changed into another—how much soever its effects may be modified,—we cannot even imagine that any of them could have been the first cause of any other, or could have existed without something preceding.

"It is much the same with the productions of nature as with the laws; and it cannot be very different, as the productions are just the results or consequences of the laws. We see that the habits of plants and animals, and the properties of compound matter, can be changed; and when we once observe how the change takes place, we generally are able, within certain limits, to bring it about. And, just as we expect, when we think over the matter correctly, we find that we can effect the greatest and the most beneficial changes in those things of which we have the most knowledge. Dead substances we can manage the best, because we can in most instances take them to pieces, and in many we can put them together again. Vegetables rank next; after them animals, and then ourselves—in so far as we are material. But, even in the simplest, that is, in the best understood of these cases, we find a boundary which we cannot pass. No art of man, and not any process of nature which we know, can make an eagle graze on the common like a goose; as little can the lion be made literally to 'eat straw with the ox;' and even in dead matter, we, in every case, come at last (and the road is seldom a long one, though often difficult to find,) to substances which we call '*simple;*' and as those simples are not convertible the one into the other, and as they are all as necessary to the things and appearances of nature as well as the laws are, the whole must have had a simultaneous origin. Whether, therefore, we look at the objects or the events in nature, we are alike convinced that they could not of themselves have begun, but must have had their origin in ONE, and One greater than them all—One who knew before any of them was in existence how they all were to act, singly or in concert, and what were to be the whole of their appearances, throughout the entire period of their succession. That is the ultimate lesson which concludes the book of nature; and if we read that book far enough 'with our own eyes,' we are sure to arrive at it; and there is this consolation in the matter, that, instead of our tiring of it, it ceases to be felt as a task, and becomes play the moment we enter upon it—or, at least, the moment that we become in earnest with it."

Our limits will not allow us to make further extracts, or we might enrich our pages considerably. The book is one of which the reader can scarcely ever tire—in looking over its pages we are forcibly reminded of "Auld lang syne," when, with the talented author, we have often emerged from the noise and bustle, and smoke. of the vast metropolis, and listened with delight to his description of many of the subjects which he has so eloquently pourtrayed in his peculiar original style, in this admirable little volume.

THE MECHANISM OF MAN.

"I am fearfully and wonderfully made."—*Psalms* CXXXIX, 14.

Fond atheist! could a giddy dance
Of atoms blindly hurled
Produce so regular, so fair,
So harmonized a world.

Why do not Lybia's driving sands,
The sport of every storm,
A palace here, the child of chance,
Or there a temple, form.

Presumptuous wretch! thyself survey—
That lesser fabric scan;
Tell me from whence the immortal dust,
The God, the reptile man?

Where wast thou, when the embryo earth
From Chaos burst its way—
When stars exulting sang the morn,
And hailed the new-born day?

What fingers brace the tender nerves,
The twisting fibres spin?
Who clothes in flesh the hardening bone,
And weaves the silken skin?

How came the brain and beating heart,
Life's more immediate throne,
(Where fatal every touch,) to dwell
Immailed in solid bone?

Who taught the wandering tides of blood
To leave the vital urn?
Visit each limb in purple streams,
And faithfully return?

How know the nerves to hear the will,
The heavy limbs to wield?
The tongue ten thousand tastes discern,
Ten thousand accents yield?

How know the lungs to heave and pant?
Or how the fringed lid
To guard the fearful eye, or brush
The sullied ball, unbid?

The delicate and winding ear
To image every sound—
The eye to catch the pleasing view,
And tell the senses round?

Who bids the babe now launched in life
The milky draught arrest,
And with its eager finger press
The nectar-streaming breast?

Who, with a love too big for words,
The mother's bosom warms,
Along the rugged paths of life,
To bear it in her arms?

A GOD! a GOD! creation shouts;
A GOD! each insect cries;
He moulded in his palm the earth,
And hung it in the skies.

METEOROLOGICAL RECORD, KEPT IN THE CITY OF NEW-YORK,

From the 1st to the 31st day of July, 1833, inclusive.

Prepared for the Mechanics' Magazine and Register of Inventions and Improvements.]

Date.	*Hours.*	*Thermometr.*	*Barometer.*	*Winds.*	*Strength of Wind.*	*Clouds from what direction.*	*Weather.*
July 1....	6 a. m.	70	29.90	SW	moderate	WNW	fair
	10	78	29.91	..	..	..	..
	2 p. m.	85	29.98	SSW—S	..		clear
	6	81	29.98	S—SSW	light	NNW	fair | haze strip at WNW
	10	78	30.00	SSW	moderate		clear
" 2....	6 a. m.	72	29.96	SW	..	WSW / SW	cloudy, (low foggy scuds)—fair
	10	80	29.96	..	..	..	fair
	2 p. m.	86	29.80	S	..	..	.. —heavy rain at Albany at 5 o'clock
	6	74	29.76	S & variable	..	..	.. —cloudy at west—rain at 8 o'clock
	10	73	29.84	SW	light	WSW	cloudy—rain
" 3....	6 a. m.	68	29.88	E	..	SW	.. ..
	10	68	29.88	NNE	moderate	.. / NE	rain
	2 p. m.	66	29.87	..	..	.. / N	.. —cloudy
	6	66	29.87	WNW	light	SW / NW	cloudy
	10	65	29 90		..	SW	fair
" 4....	6 a. m.	62	29.96	WSW	..	WNW	.. , with scuds from WNW
	10	70	30.06	..	..	..	.. .. ..
	2 p. m.	76	30.05	..	..	WNW	.. .. ..
	6	72	30.06	.. —NW	..	..	..
	10	68	30.10	NW	..	..	.. , with scuds from NW
" 5....	6 a. m.	63	30.20	NNW	..	NW	.. ..
	10	72	30.24	..	moderate	WSW / NW	.. ..
	2 p. m.	78	30.22	NW—WNW	..	NW	.. ..
	6	75	30.20	WSW	..	..	..
	10	68	30.21	..	..		..
" 6....	6 a. m.	63	30.23	SW	..	W by S	..
	10	72	30.25	..	..	..	..
	2 p. m.	80	30.20	S	..	..	..
	6	76	30.16	..	..	..	..
	10	70	30.10		..		cloudy —rain
" 7....	6 a. m.	70	30.01	WSW	..	..	.. —fair
	10	77	30.02	SW—SSW	..	W by S / WNW	fair
	2 p. m.	83	29.98	.. by N	..	..	.. —cloudy
	6	80	29.93	..	..	..	cloudy —fair
	10	74	29.94	..	light	W	fair
" 8....	6 a. m.	70	29.90	SW	..	WSW	..
	10	73	29.90	WSW	moderate	W by S / WSW	..
	2 p. m.	87	20.84	..	..	..	.. —cloudy at 3—shower at 4 45
	6	82	29.80	SW	..	SW	cloudy
	10	77	29.79	..	..	..	..
" 9....	6 a. m.	73	29.77	WSW—W by S	..	W by S	cloudy—rainy—cloudy—rainy
	10	78	29.80	W	..	SW by W / NW	rainy—cloudy
	2 p. m.	82	29.80	NW	..	.. / NNW	fair
	6	76	29.87	NNW	fresh	NNW	..
	10	66	29.98	..	moderate	..	clear
" 10....	6 a. m.	63	30.05	..	..	NW	fair, with haze from WNW
	10	72	30.10	SW	.	..	.. .. ..
	2 p. m.	78	30.07	..	..	..	.. .. ..
	6	74	30.01	..	..	WSW	.. .. ..
	10	68	30.03	..	..	..	.. .. ..
" 11....	6 a. m.	63	29.98	..	..	..	..
	10	74	29.95	SSW	..	..	..
	2 p. m.	81	29.85	S	..	..	..
	6	76	29.78	..	..	..	.. —cloudy at NW
	10	72	29.78	..	..	..	thunder storm
" 12....	6 a. m.	68	29.77	N	..	NW	fair —scuds from NW
	10	74	29.80	W	..	WNW	..
	2 p. m.	82	29.81	W by S	..	W	..
	6	80	29.87	..	..	..	.
	10	74	29.95		..		..
" 13....	6 a. m.	70	30.04	ENE	light	W by S	cloudy —fair
	10	76	30.06	E—SSE	..	W	fair
	2 p. m.	84	30.06	SSE	..	..	..

CITY OF NEW YORK—CONTINUED.

Date.	*Hours.*	*Thermometr.*	*Barometer.*	*Winds.*	*Strength of Wind.*	*Clouds from what direction.*	*Weather.*
July 13....	6 p. m.	79	30.03	SSE	light	W / SSE	fair, with light sea scuds from SSE
	10	74	30.04	..	..	SSE	.. .. ..
" 14....	6 a. m.	74	30.00	S	..	SW	..
	10	83	29.95	S—SE	..	..	..
	2 p. m.	89	29.86	SE—NW	strong	.. / S	.. thunder at 3 o'c.—heavy thunder shower at 4½ o'clock
	6	76	29.85	S—SE	faint	WSW	cloudy—shower at 8½ o'clock—fair
	10	73	29.83	..	..	..	rain
" 15....	6 a. m.	76	29.85	WSW	light	SW by W	fair
	10	78	29.90	W by S	moderate	.. / NW	..
	2 p. m.	82	29.88	..	fresh	.. / W	..
	6	74	29.90	..	..	SW	..
	10	70	29.93	..	..	..	..
" 16....	6 a. m.	62	29.96	WSW	..	..	..
	10	70	29.94	SW	moderate	..	..
	2 p. m.	77	29.93	..	..	..	..
	6	75	29.90	..	..	W	..
	10	71	29.90		..		..
" 17....	6 a. m.	66	29.90	NNW	light		cloudy
	10	70	29.91	..	..	WNW	.. —light showers
	2 p. m.	75	29.93	NNW—W	..	W	fair
	6	72	29.98	WSW	faint	..	..
	10	69	30.02				..
" 18....	6 a. m.	63	30.08	SSW	light	SW	..
	10	70	30.10	SW	..	W	..
	2 p. m	78	30.12	W	..	..	..
	6	73	30.13	NW	..	NNW	..
	10	68	30.20	..	.	NW	..
" 19....	6 a. m.	62	30.22	NNW	moderate	W	..
	10	70	30.23	..	..	..	..
	2 p. m.	79	30.25	W	fresh	SW	.. —atmosphere hazy
	6	74	30.19	SE	..	NW	cloudy—light showers
	10	71	30.18	..	..	..	.. —heavy rain in the night
" 20....	6 a. m.	64	30.08	..	moderate	W	fair—cloudy
	10	66	30.09	NE	..	NNW	cloudy
	2 p. m.	73	30.10	..	..	NW / NE	.. —fair—scuds from NE
	6	67	30.12	..	fresh	..	..
	10	67	30.12	..	..		..
" 21....	6 a. m.	70	30.15	NW	moderate		fair—cloudy in the west
	10	73	30.15	N	..	N	cloudy
	2 p. m.	77	30.15	SW	..	..	fair
	6	74	30.10	SE	..	NW	..
	10	70	30.10	WSW	light	WSW	clear
" 22....	6 a. m.	71	30.08	..	..	..	cloudy
	10	77	30.05	..	..	..	fair
	2 p. m.	89	30.01	..	..	NNW	..
	6	86	30.00	NW	..		..
	10	84	30.03	..	..	..	..
" 23....	6 a. m.	73	30.14	NE	..		clear
	10	78	30.16	NNE—NNW	..		
	2 p. m.	82	30.15	SW—SSE	..		..
	6	76	30.12	SSE	moderate		..
	10	72	30.12	SSW	..		..
" 24....	6 a. m.	69	30.05	SW	..		..
	10	80	30.00	..	..		
	2 p. m.	91	29.94	SW—NW	..	..	
	6	78	29.96	NNW	..	..	. —cloudy at 4½ o'clock
	10	75	29.98	..	..		thunder showers—cloudy
" 25....	6 a. m.	74	30.05	..	..	N	cloudy
	10	75	30.08	NNE	fresh	..	..
	2 p. m.	79	30.11	..	..	WNW	..
	6	72	30.11	SSW	moderate	SSW	.. —light showers
	10	71	30.15	..	fresh	..	fair
" 26....	6 a. m.	63	30.20	NNE	moderate	W	..
	10	70	30.21	N	..	SW	..
	2 p. m.	79	30.19	SSW	faint	S	..
	6	73	30.15	SSE	light	..	..
	10	69	30.13	..	..	..	..
" 27....	6 a. m.	66	30.12	SW	fresh	WSW	clear
	10	74	30.00	..	moderate	..	fair
	2 p. m.	84	29.95	..	..	..	..
	6	80	29.81	..	fresh	NNW	..

CITY OF NEW-YORK—CONTINUED.

Date.	*Hours.*	*Thermometr.*	*Barometer.*	*Winds.*	*Strength of Wind.*	*Clouds from what direction.*	*Weather.*
July 27....	10 p. m.	78	29.81	SW	fresh	NNW	fair
" 28....	6 a. m.	75	29.82	WNW	..	..	clear
	10	85	29.89	..	..	SSW / WNW	fair
	2 p. m.	83	29.95	..	strong	WNW	.. —wind at times violent
	6	76	30.01	..	moderate	..	..
	10	63	30.10	..	..	..	..
" 29....	6 a. m.	63	30.17	NNE	..		..
	10	70	30.11	WNW—SW	..	..	..
	2 p. m.	77	30.04	SW—S	..	..	..
	6	75	29.97	S—SSE	fresh	W	.. —gale from the eastward
	10	73	29.96	E	gale	SSE	.. , with scuds from SW
" 30....	6 a. m.	75	29.76	SW	strong	SW	.. .. ..
	10	80	29.70	..	fresh	..	.. —light showers
	2 p. m.	84	29 65	WSW	..	NNW	rain
	6	76	29.72	NNW	..	..	cloudy
	10	70	29.80	..	moderate		..
" 31....	6 a. m.	62	29.92	..	light		clear
	10	72	29.98	..	..	NW	fair
	2 p. m.	81	29.98	W	..	..	..
	6	75	29.98	..	..	..	..
	10	70	29.98	..	..	..	..

Arithmetical mean of the thermometer for the month of July, 74.14.

Maximum height of the barometer in July, 30.25 in.—Minimum, 29.65 in.—Range, 0.60 in.

The observations of winds for July result as follows: From the North-Eastern quarter, including N. 15—from the South-Eastern, including E. 16½—from the South-Western, 74—from the North-Western, 40½.

The observations of the higher currents, as indicated by the highest observed clouds, result as follows: From North-Eastern quarter, 5—from the South-Eastern, 2—from the South-Western, 65—from the North-Western, 54.

METEOROLOGICAL RECORD, KEPT AT AVOYLLE FERRY, RED RIVER, LOU.

For the month of June, 1833—(*Latitude* 31.10 *N.*, *Longitude* 91.59 *W. nearly.*)

[Prepared for the Mechanics' Magazine and Register of Inventions and Improvements.]

Date.	*Thermometer.*			*Wind.*	*Weather, Remarks, &c.*
1833.	Morn'g.	Noon.	Night.		
June 1	75	84	81	S—high	clear—light flying clouds all day
" 2	76	87	81	S—light	.. — .. .. ..
" 3	71	85	78	..	.. —yellow figs ripe, and very large
" 4	71	86	80	..	.. —rain in the evening
" 5	70	86	80	..	..
" 6	71	87	79	..	..
" 7	73	88	78	..	.. —evening light showers and calm
" 8	72	81	78	calm	cloudy all day
" 9	73	85	79	W	clear all day
" 10	73	86	80	N—light	cloudy morning—clear evening
" 11	71	86	78	calm	clear all day—finished mowing first crops of clover and saved the hay
" 12	73	88	78	..	clear morning—evening wind W and cloudy
" 13	73	87	82	W—light	.. — .. calm
" 14	72	84	82	calm	.. —cloudy and thunder at night
" 15	76	80	80	..	cloudy—severe rain and thunder from 8 a. m. to 1 p. m.—cloudy all night
" 16	75	87	82	S—high	clear—flying clouds—evening calm
" 17	75	88	82	..	.. ..
" 18	76	88	81	..	.. .. —River rising
" 19	77	89	83	S—light	.. —evening light showers—calm
" 20	74	84	79	calm	cloudy morning—rain and thunder—evening clear
" 21	73	87	79	..	clear
" 22	76	89	79	..	.. morning—evening rain, wind SW—river risen ½ inch, and at a stand
" 23	76	86	80	SW—high	.. in the evening—wind W, light—night wind NW, high—tomatoes ripe
" 24	70	79	69	N—high	.. all day—night calm—finished gathering our crops of Irish potatoes
" 25	64	80	75	calm	.. .. —Red River falling
" 26	66	85	78	SW	.. .. —United States Snag Boats, Capt. Shreeve, from the raft, went
" 27	69	85	79	SW—light	.. .. [down, in all 4 steamboats
" 28	71	34	60	calm	cloudy all day
" 29	73	88	61	S	clear—light flying clouds
" 30	74	90	62	calm	.. ..

Red River has fallen this month two inches, and is now 10 inches below extreme high water of 1828.